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See also back page

1 E 12

Modern techniques of food sterilization - uperization.

Charlett, S. M.

Food Trade Review 41 (9) 31-35 (1971) [En]

The uperization process is described under the headings: preheating, uperizing, timing, flash cooling and secondary cooling. Recent developments in uperization which make it possible to process products containing certain levels of solid material, are considered. VJG

1 F 55

Sterilizable flexible packaging.

Turtle, B. I.; Alderson, M. G.

Food Manufacture 46 (9) 23-24, 26-27, 29, 31 & 37 (1971) [11 ref. En] [Metal Box Co. Ltd., Res. & Development Dept., 37, Baker Street, London, UK]

The subject is presented under the following headings: compatibility, covering materials available and aspects of shelf-life testing, tainting and toxicity; heat processing, covering heat process media, process evaluation and automatic processing equipment; integrity, covering possibility of failure due to poor seals, impacts or puncturing, and biotest procedures; heat sealing and filling, with reference to mechanical resistance during transit and leakage detection and prevention; and marketing aspects, covering of the flexible can and commercial interest in flexible or semi-rigid containers. AB

1 H 10

[Problems in aseptic bottling of beer.] Probleme der aseptischen Bierabfüllung. [A lecture]

Voerkelius, G. A.

Brauwelt 111 (60) 1227-1233 (1971) [4 ref. De, en, fr] [Staatliche Brautechnische Prüf- und Versuchsanstalt Weihenstephan, W. Germany]

An essential requirement for aseptic filling is well-trained personnel and effective biological control. Aspects discussed include obtaining biologically sterile beer from the conditioning tank, main sources of internal and external infections, effect of different filling procedures on biological stability of beer, and infection points between the filter and the filled bottle. A typical infection cycle is described and special attention is given to contamination of the air by empty bottles and the need for highly efficient bottle washing. AS

1 H 101

[Preliminary experiments with bulk aseptic storage of fruit juices.]

Lipowski, J.; Gorecka, H.; Pambowski, E.

Prace Instytutów i Laboratoriów Badawczych Przemysłu Spożywczego 20 (1) 63-80 (1970) [14 ref. Pl, ru, en] [Inst. Przemysłu Fermentacyjnego, Poland]

Industrial-scale experiments were carried out to develop a method of aseptic filling and storage of fruit juices in horizontal cylindrical bulk containers, which were sterilized by an 0.02% solution of Sterinol. Apple juice produced on a Bertuzzi line was used as test product. The containers were filled aseptically with juice cooled to between -2° and -6°C. Pressure changes due to fermentation were recorded. The apple juice was of a better organoleptic quality than the same juice stored at the same temp. in small glass containers. 2-stage cooling systems would improve the cooling process. STI

1 S 64

[Process and apparatus for preserving sausages.]

Verfahren und Vorrichtung zum Haltbarmachen von Wurstwaren.

Häge, H. (Ernst Brendel KG)

West German Patent Application 1 960 329 (1971) [De]

Sausage, p,se

Sausages, particularly of the spreadable variety are sterilized and packaged in sterilized, air-impermeable plastics film. The film is sterilized, when drawn off the reel, by 2-side UV-radiation. W&Co

1 S 88

✓ [Investigation of the sterilizing effect of the germicidal lamp.]

Telegdy, I.

Husipar 19 (6) 252-256 (1970) [5 ref. Hu, ru, en, de] [Husipari Allatorvosi Ellenőrző Szolgálat, Gubacsi ut 6/b, Budapest IX, Hungary]

On using a 15 W germicidal lamp of MB-6711 type, 92% germicidal effect was observed on *Bacillus subtilis* when applying the lamp for 10 sec from a distance of 20 cm, 99.8% effect on *Streptococcus faecalis* (12 sec from 20 cm), 99.8% effect on *Staphylococcus aureus* (18 sec from 30 cm), 99.4% on *Staph. albus* (12 sec from 30 cm), 100.0% on *Escherichia coli* (12 sec from 20 cm), 100.0% on *Salmonella anatum* (12 sec from 20 cm), and 95.7% on a mixed bacterial flora obtained from a basic mixture for luncheon meat preserves (20 sec from 30 cm). IF

2 E 57

✓ Modern techniques of food sterilization - uperization.

Charlett, S. M.

Food Trade Review 41 (8) 25-27 (1971) [En]

2 F 64

[Method for sterile packaging of products which can be sprayed or foamed, in aerosol containers.] Verfahren zum sterilen Abpacken von versprühbaren oder aufschäumbaren Stoffen in Aerosolbehälter. Solms-Baruth, H. (Milchwirtschaftliche Forschungs- und Untersuchungsgesellschaft mbH) West German Patent Application 1 942 056 (1971) [De]

Products, e.g. cream, or processed cheese, are packaged in aerosol containers, [See FSTA (1971) 3 6F420]. The sterilization method is improved by heating the container to 140°C for ~5 min, and cooling and then filling under sterile conditions, or filling when hot. Optionally, the container is evacuated prior to sterilization and filled with CO₂ or a sterilizing agent, e.g. ethylene oxide or ethanol. Alternatively, the propellant, e.g. N₂O or halogenated hydrocarbons, is introduced, either alone or in mixture with a sterilizing agent. W&Co

2 F 120

[Benz & Hilgers Formseal on the way to aseptic filling.] Benz & Hilgers Formseal auf dem richtigen Weg aseptischer Abfüllung. Hansen, R. Nordisk Mejeri-Tidsskrift 37 (7) 177-178 (1971) [Da, de]

A Benz & Hilgers Formseal machine for 'semi-aseptic' packaging of, e.g. quarg, has provision for sterilizing the plastics strip, by passage through an H₂O₂ bath, before container formation, heating it by IR radiation and for carrying out forming, filling and sealing operations in a partly closed space in an atmosphere of sterile air. 2 machines of this type are said to be used in German dairies. FL

2 P 195

The Malmö seminar on UHT milk. Anon.

Milk Industry 69 (4) 26, 28 & 29-30 (1971) [En] See also FSTA (1971) 3 11P1874.

2 P 196

[Manufacture of UHT products.] Herstellung von UHT Produkten.

Lovio, A.

Nordisk Mejeri-Tidsskrift 37 (7) 151-153 (1971) [Sv & De]

The article includes a brief description of the use of mini-Tetra Brik packs for UHT light cream (12% fat) in 200-ml portions in Finland and whipping cream (35% fat) in 250-ml portions in Sweden. The storage life of the aseptically packaged cream is 8-10 wk without refrigeration. Distribution is in boxes each containing 12 packs. FL

2 P 244

[Hygienic requirements for infant foods.]

Hygienische Anforderungen an Säuglingsnahrung Mossel, D. A. A.; Grün, L. 1468dd 155 (2) 103-116 (1971) [120 ref. De, en] [Centraal Inst. voor Voedingsonderzoek TNO, Zeijl The Netherlands]

Samples of raw milk, destined for manufacture sterilized 'ready-made' milk for infants, were obtained from various farms and examined bacteriologically and for pesticides. Bacterial counts/ml were as follows: total count, from 10³ to 2 × 10⁶; Gram-negative bacilli, from <10 to 9 × 10⁴; Staphylococcus aureus, from 40 7000; group D streptococci, from <10 to 8000; clostridia, <1; and Bacillus cereus, from <10 to 90. No antibiotics were detected in the raw milk. Additional substances used in manufacture (saccharose and Sirona) also had low bacterial counts of ~1000/ml. The vitamin content of the milk changed little during Uperization and packaging, and levels of pesticides in the product were <10⁻³ µg/ml (<2 × 10³ µg/ml for DDT), was only ~0.1 × levels reported in breast milk. All samples of the product were sterile after incubation for 1 month at 30°C. The following norms are recommended for 'ready-made' infant milk: total microbial count, <50 000/ml; Gram-negative bacilli, <5000/ml; staphylococci and pesticides, <2 × 10⁻³ µg/ml. CDA

2 P 248

[Changes and denaturation of protein fractions in cows' milk, goats' milk and cream on processing and UHT sterilization.]

Langsrud, T.; Hadland, G.

Meieriposten 60 (31) 655-669; (33) 699-710; (34) 721-731; (35) 747-752 (1971) [47 ref. No, en] [Dairy Res. Inst., Vollebakk, Norway]

Changes in N distribution in cows' milk and goats' milk and cream (i) by heating at 80°C for various periods up to 30 min and (ii) by UHT direct steam injection at 140°C for 3-4 sec. were studied using the Aschaffenburg & Drewry process (see DSA 19: 504. Reductions in non-casein N by treatments (i), occurring mainly in the first 5-10 min, and (ii) were 84 and 57.6%, respectively, for cows' milk and 74 and 60.9% for goats' milk; losses being mostly in the β-lactoglobulin and globulin fractions [see FSTA (1970) 3 11P1537]. In cream with 10%, 25% and 35% fat, N reduction heating increased with rising fat %, apparently due to an accompanying rise in the serum protein/casein ratio. The probable origin and practical consequences of this observation are discussed. GTP

2 P 259

Aseptic process protects products.

Anon.

Food Engineering 43 (5) 133-134, 136 & 139 (1971)

[En]

A description is given of the system for aseptic processing of whipping cream and half and half at Broughton Foods Co., Marietta, Ohio. 2 plate heat exchangers are used to permit water-to-product regeneration instead of product-to-product; this system provides better protection for product flavour. Flavour stability is also controlled by removal of O_2 in the deaeration chamber. Package sizes range from $\frac{3}{4}$ -oz portion packs to 1 qt (Pure-Pak cartons); the former are produced in 3 Anderson form-seal machines. AB

3 E 86

Sterilization process.

Lodge, W.; Lucke, F.

British Patent 1 243 813 (1971) [En]

In a bulk sterilization process, the product to be sterilized is held in a closed chamber and vigorously mixed in the presence of hot gas or steam, after which the chamber is evacuated and the mixing continues. IFT

3 F 157

[Packaging in the dairy industry.] Obaly a obalova technika v mliekarstve. [Conference proceedings] Prekopp, I. (Editor)

224pp. (1971) [Numerous ref. Sk, Cs] Zilina, Czechoslovakia: Dom Techniky

This publication contains the following papers presented at the conference in Zilina, 28-30 Sept. 1971: Present state of packaging and packaging techniques for dairy products in Czechoslovakia, by J. Siman (pp. 2-23); Packaging of milk and milk products [an international survey of recent developments], by F. Lang & A. Lang (pp. 24-31); Packaging milk and liquid milk products [an international survey], by B. Hylmar (pp. 32-42); Tetra Pak system of milk packaging, by E. Krook (pp. 43-65); Packaging liquid foods in plastics sachets, by T. Halonen (pp. 66-76); Bertopack system for packaging milk in sachets made from a tube, by H. Uteschill (pp. 77-90, 9 ref.); Packaging milk in plastics bottles, by H. Marotte (pp. 91-100); Packaging cheese, by I. Prekopp (pp. 101-140); Modern techniques for packaging liquid and viscous products into pre-formed plastics containers, by K. Raue (pp. 141-149); Packaging butter, by I. Stepankova (pp. 150-160); Packages for concentrated and dried milk products, by L. Peterkova (pp. 161-170); Packaging ice cream, by A. Lukas (pp. 171-178); Packaging milk products into cups and sachets, (by V. Svara 179-183); Zupack system for milk packaging, by B. Janetschek (pp. 184-196); Packaging milk in polyethylene bottles, by G. Peck (pp. 197-212); and Packaging pasteurized and sterilized milk in plastics bottles and of other milk products in paper or plastics packages, by W. Rickli (pp. 213-233). FL

3 F 176

[Plastics containers for the aseptic bottling of liquid foods.]

Pasquarelli, O.

Materie Plastiche ed Elastomeri 35 (6) 834-836 (1969) [It] [Montecatini Edison, Milan, Italy]

A brief account of the preservation of milk by sterilization introduces a description of a recently developed improved container. This consists of a light disposable polyethylene or polypropylene bottle extruded and blown by sterile air. The bottle is aseptically sealed by thermal welding and either immediately filled with sterilized milk, manufacture and filling being synchronised, or stored for filling on a convenient later occasion. GTP

3 P 290

[SIG packaging machine in large-scale production of yoghurt.] SIG stellte sich von Anfang an auf die Grossproduktion von Joghurt ein. Anon.

Nordisk Mejeri-Tidsskrift 37 (7) 179-181 (1971) [Da & De]

An illustrated description is given of a SIG packaging machine 'Sigotherm L300' in which plastics containers (usually polyvinyl chloride or polystyrene) are formed, filled and sealed at a rate of 180/min (yoghurt containers, 180-g size) or 120/min (500-g size). The softening of the strip of packaging material is by IR irradiation and the formation of the containers is by means of a 4-column frame press and compressed air; the Al lids, produced in a unit arranged at right angle to the packaging machine, are heat-sealed onto the full containers in 2 stages. The changing-over of the container size (range 75-500 g), said to take 5-10 min, is done by altering the height whilst keeping the cross-sectional area constant. The Sigotherm Aseptic machine is briefly mentioned. In this machine sterile containers are produced using compressed air at 150°C and capped with Al lids sterilized by passage through a H_2O_2 bath, the filling and sealing operation taking place in a closed tunnel in an atmosphere of sterile air. FL

3 P 315

[Distribution of material and temperature in an apparatus for direct heating of milk and milk products.] Stoff- und Temperaturverteilung in einer Einrichtung zur direkten Erhitzung von Milch und Milchprodukten.

Steinberger, U.

Milchwissenschaft 26 (10) 629-636 (1971) [13 ref. De, en] [Entwicklungsabteilung der Eduard Ahlborn AG, W. Germany]

The operation of the UHT system was studied by using a transparent model in which the course of the injected, suitably tinted, steam was followed photographically, and the temp. profile of the heated liquid (water) recorded by appropriately

located thermocouples. Momentary local fluctuations of temp. at the steam cone can be neglected in evaluating the time-temp. integral. Comparison of injection and indirect heat treatments indicated that the direct method was slightly, but not very significantly, the less injurious to the milk constituents for the same bactericidal effect; despite higher constructional and operating costs the use of steam injection being justified with certain heat-sensitive products. GTP

3 P 438

Alfa-Laval shows its latest developments.

Anon.

Dairy Industries 35 (11) 775-779 (1970) [2 ref. En, fr, de, es]

Included in this report of a publicity campaign by Alfa-Laval, Sweden, in which 17 representatives of the dairy press from 14 countries were shown plant and dairy factories to see examples of the company's most modern equipment, are brief descriptions of: heat-exchangers, sterilization plant, machinery for anhydrous milk fat production and ice cream equipment manufactured at Lund; the production of liquid milk, cream, cultured milk products and butter oil in a factory at Lunnarp handling milk from 2000 producers; automatic cheesemaking innovations in a factory at Falkenberg; centrifugal separators manufactured at Tumba; and bactofugation. SAC

3 P 439

Processes, packages variety of products. Swedish dairy uses multiple kinds of methods, materials to handle huge quantities of milk each day.

Saal, H.

American Dairy Review 32 (7) 31-33 & 68 (1970) [En]

This is a description of the highly automated Lunnarp Dairy in Southern Sweden, receiving 140 million lb milk per yr from ~2000 producers; about a quarter of the producers, producing nearly half the milk intake, have farm milk tanks. Milk, in excess of that needed for liquid supplies, is manufactured into butter and other traditional and new products, including filmjolk and UHT milk-based vanilla and chocolate mousse. SAC

Advances described include: successful continuous baking of bread using a combination of microwave and thermal energy - a 1½ lb white loaf can be baked in 4 min; new continuous mixer using rapid oscillation of solid balls in a fixed spiral inside a vertical tube; retortable pouch which allows boil-in-the-bag vegetables to be pre-cooked in the bag at the factory; new freezers for producing 'store and pour' forms of frozen liquid and pureed materials such as chopped spinach, egg and soups; continuous density measurement without mechanical contact, with a device using γ-rays from a ⁶⁰Co or ¹³⁷Cs source - potential applications include monitoring the sugar content of syrups and fruit juices; new system for mechanical shelling of cashew nuts; fully automatic frozen fish stick unscrambling, collating and cartoning line; direct steam injection for sterilization of molasses; and a simple method of extracting both high quality oil and protein from fresh coconut. AB

4 E 177

Food aerosols.

Anon.

Food Industries of South Africa 24 (1) 27 & 29 (1971) [En]

Advantages of aerosol packages given include convenient, hygienic and economic application; ease of storage; prolonged storage life, even in the case of stored containers; and exclusion of exposure to light (excepting transparent glass aerosols), atmospheric O₂ and microorganisms. Problems encountered in changing from conventional methods of packaging to pressure packaging are discussed as follows: physical problem - stability is affected by homogeneity and viscosity of the product to be packaged; changes in products - pressure-packaged foods will undergo certain changes in the face of hermetic seals e.g. non-enzymatic browning, retrogradation of starches; and preservation - difficulties of sterilization are outlined. Choice of propellant is also discussed: those permitted in Germany at present are CO₂, N₂ and N₂O, and in the USA, C-318 (octofluoro-cyclobutane) and 115 (perfluoromono-chloroethane) are also allowed. Future applications mentioned include the introduction of spice sprays. AB

4 F 196

[Aseptic packaging in paper and plastics materials.] Aseptische Abfüllung in Papier und Kunststoff.

Coster, D. R. A.

Flüssiges Obst 38 (6) 253-260 (1971) [24 ref. De]

4 E 140

Advances in Europe.

Woollen, A. H.

Food Engineering 43 (11) 75-78 (1971) [En]

The production programme of Tetra Pak AB (Lund, Sweden) and connected problems of aseptic bottling are reviewed under the following headings: packs used in the production programme (Tetra standard, Tetra Brik, Tetra Rex, Tetra Cup, Tetra gello bottle); packaging materials (PVC and PET/VDC) and their physical properties; use of the packs in breweries; aseptic bottling (treatment of the product, heating, filtration, addition of preservatives or antibiotics, irradiation); handling of filled packages and bottling equipment; and quality control in aseptic filling. JMS

F 224

Aseptic packaging of UHT coffee cream in plastics portion cups. Die aseptische Abfüllung von ultrahocherhittem Kaffeeahm in Kunststoffportionenbechern ist jetzt eine Realität. Hansen, R.

Nordisk Mejeri-Tidskrift 37 (11/12) 279-280 (1971) [De & Da]

Information is given very briefly on a new aseptic portion pack (15 ml) containing Uperised 5% coffee cream, launched by Verbandsmolkerei Berne. The pack is in the form of a plastics cup (5 mm high and 41 mm in diam.). Details of the aseptic packaging procedure used are not given. L

G 193

The food processing front of the seventies. Ford, K.

Journal of the American Dietetic Association 58 (1971) 103-108 (1971) [7 ref. En] [Util. Economics Div., Group, Marketing Economics Div., Economic Service, USDA, Washington, DC, USA] Processing changes which may affect the food industry during the seventies are considered: soy proteins, aseptic canning and reverse osmosis. Their advantages, disadvantages, uses and future prospects are discussed. VJG

J 220

Production problems in thermal processing of canned foods.

Ben-ul-Haque

Science and Industry (Karachi) 8 (1) 1-10 (1971) [7 ref. En] [PCSR Lab., Lahore 16, Pakistan]

The article reviews the basic requirements of thermal processing, demonstrates calculations for heat processing based on the heat resistance of *Stridium botulinum*, describes the measurements employed in canned foods using thermocouples, and briefly describes HST processing and aseptic canning. PG

SF 258

[Long-term storage of potato chips.] Verfahren zur Aufbewahrung über einen längeren Zeitraum von abgepackten Pommes frites, Kartoffel-Ships od. dgl. Firma Wilhelm Eppe

West German Patent Application 2 010 257 (1971) [De]

Potato chips and crisps are packaged hot and in a sterile state in transparent or opaque plastics packs which are totally evacuated, then refilled 30-80% with pure, sterile N_2 , O_2 or other food-compatible gas. W&Co

SF 279

Handbook of package engineering. [A book] Hanlon, J. F.

xi+544pp. ISBN 0 7 025993 3 (1971) [En] New York, USA: McGraw-Hill Book Co. Price \$18.50

This reference work for packaging engineers covers the subject under the headings: Elements of packaging (28pp.); Folding cartons and setup boxes (25pp.); Films and foils (60pp.); Paper and paperboard (22pp.); Corrugated fibreboard (18pp.); Glassware (25pp.); Metal containers (31pp.); Plastics (88pp.); Closures, applicators, fasteners, and adhesives (32pp.); Bags and envelopes (11pp.); Aerosols (29pp.); Fibre tubes, cans, and drums (16pp.); Coatings and laminations (18pp.); Labels and labelling (13pp.); Wood containers (15pp.); Laws and regulations (23pp.); Cushioning (5pp.); Test methods (9pp.); Quality control (11pp.); and Machinery and equipment (31pp.). Each section is separately paginated. An 18-pp. subject index is included. JN

S O 256

Food preservation and packaging in the seventies. [A symposium]

United Kingdom, Institute of Food Science & Technology, Northern Ireland Branch
IFST Proceedings 4 (2) 81-86 (1971) [En]

Summaries are given of the following papers read at a symposium held at Queen's Univ., Belfast, UK, on 30 Sept.-1 Oct. 1970: Cryogenics, by C. L. Clough, who described major current processes for freezing foodstuffs with liquid N_2 ; Dehydration, by S. D. Holdsworth, who reviewed the many current techniques, particularly freeze drying; Gas packaging, by A. N. Jones, who divided the subject into biologically active and biologically inactive packaging systems, and described techniques for each system; Aseptic packaging, by D. A. Herbert, who described the basic techniques for sterilization and canning of liquids; Irradiation, by T. A. Roberts, who discussed radiation techniques; Chemical additives, by M. Sharratt, who reviewed food additives legislation; Marketing, and distribution, by G. J. P. McGinn; and Consumers' attitudes, by D. Proctor. DBC

5 L 376

Modified corn starch improves freeze-thaw stability at 10% lower cost.

Anon

Food Processing 32 (11) 24 & 29 (1971) [En]

A highly modified corn starch (Amaizo 710 Stabilizer) with extreme freeze-thaw stability which produces low initial viscosity hot pastes has been developed. Max. viscosity is developed at $\sim 80^{\circ}\text{F}$, and the clarity of starch pastes is good even after several freeze-thaw cycles. Recommended applications for the starch-stabilizer include low pH products that require soft sets after processing, frozen gravies, meat and gravy combinations, some aseptically canned products and baker's and Bavarian creams. PG

5 P 658

[Self-cleaning separator for the manufacture of double-cream cheese.] Separator mit selbstreinigender Trommel für die Herstellung von Doppelrahm-Frischkäse.

Anon.

Nordisk Mejeri-Tidsskrift 37 (11/12) 295-297 (1971) [Da & De]

An illustrated description is given of a self-cleaning separator (Westfalia KSA 3006) specially designed for use in the manufacture of double-cream cheese with 42-48% TS and $\geq 70\%$ fat in DM, using milk of fat content adjusted to 9-10% by the addition of cream. The milk is as a rule homogenized at $40-80^{\circ}\text{C}$. The curd from this milk has a lower sp. gr. than whey because of the high fat content. The curd-whey mixture is fed into the separator bowl through a central inlet and is separated into a light fraction (curd) and a heavy fraction (whey), the former being pumped by a gear pump to a mixing vessel. The TS content of the curd is adjustable. The solids that accumulate in the periphery of the bowl are discharged automatically at 2-4 h intervals. The fat content of the whey is as a rule 0.05-0.1%. A diagram of a complete double-cream cheese production line is given. By pasteurizing the curd-whey mixture at $60-80^{\circ}\text{C}$, protecting the product against airborne infection and aseptic packaging, cheese of long shelf-life may be obtained. FL

5 P 792

[Changes in the fatty acid composition of milk fat during UHT sterilization and storage of sterilized milk.]

Sokolova, T. V.; Seleznev, V. I.; Yusupova, I. U. **Molochnaya Promyshlennost'** 32 (12) 9-12 (1971) [5 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

UHT sterilization of milk at $140-142^{\circ}\text{C}$ for 3-4 sec produced a slight fall in unsaturated fatty acid content which continued and increased by 3.1% during subsequent storage in cartons at room temp. for 90 days. GLC examination showed this fall to originate chiefly in reductions in $\text{C}_{18:2}$ and $\text{C}_{20:1}$ acid contents of from 2.6 to 0.9% and 0.9 to 0%, respectively. These changes, accompanied by 1.8% and 1.1% increases in myristic and palmitic acid contents, respectively, became evident after 60 days. Small increases in the content of conjugated dienes and trienes, detected by spectrophotometric observation of the fat, occurred after ~ 30 days. GTP

6 D 347

ADR plant operations survey. III. Dairy and non-dairy products processed and sold.

Anon.

American Dairy Review 33 (12) 40, 44-46 (1971) [En]

In this survey (see preceding abstr.), the proportion of plants selling or manufacturing, processing and/or packaging 25 dairy and 16 non-dairy products are tabulated for 3 categories, all plants, liquid milk plants and ice cream plants. An average of 16 of these products are sold and ~ 9 are processed or packaged per plant. Also mentioned are coffee whiteners and a growing interest in aseptic processing. SAC

6 E 235

A condensed history of the science and technology of thermal processing [canning]. I. [A review] Goldblith, S. A.

Food Technology 25 (12) 1256-1258 & 1260-1262 (1971) [28 ref. En] [Dept. of Nutr. & Food Sci., Inst. of Tech., Cambridge, Massachusetts 02139, USA]

See FSTA (1972) 4 4E146 for part II.

6 E 254

The effect of age distribution on aseptic processing. Bateson, R. N.

Chemical Engineering Progress Symposium Series 67 (108) 44-52 (1971) [15 ref. En] [General Mills, Inc., Minneapolis, Minnesota, USA]

Aseptic processes may be of the tubular, swept surface or steam injection type. Sterilization theory is summarized with explanations of the constant temp. survivor curve, the thermal destruction curve and the F_0 value. Distribution of retention times (age distribution) in swept surface heat exchangers was determined experimentally using the impulse response method. A 0.16-0.35% concn. of 20% saline solution was injected at the inlet of the heat exchanger, and the resistance of the solution at the

outlet measured by the Brush recorder and resistance probe sensor. A model to show effect of age distribution on sterilization was developed and used for the data obtained. Age distribution of a swept surface heat exchanger was found to lie between that of a perfectly mixed tank and that of plug flow in a pipe. As L/D ratio increased the age distribution became more like plug flow. Decimal reduction time (which varies with different types of organisms) had significant influence on the effective F_0 value. PG

6 E 275

Fully automatic retort control systems.

Hughes, P.

Food Manufacture 47 (2) 27-28, 31-32 & 61 (1972) [En]

Instrumentation for fully-automatic retort control systems is discussed, with special reference to: operation of the retort; equipment used; instrument presentation; process variations; continuous cookers; aseptic canning; and advantages of instrumentation. [See also FSTA (1972) 4 3E98 & 3E128.] JN

6 E 281

Environment and the food processor. Proceedings, Food Engineering Forum. [Conference proceedings]

Dairy & Food Industries Supply Association Inc.; United States of America Society of Agricultural Engineers

111pp. (1971) [En] Washington, DC 20015, USA: Dairy & Food Ind. Supply Assoc. Inc. Price \$2.50

The papers presented in these proceedings are grouped in 3 parts: (i) the influence of food processing plants on the surrounding environment (pollution and waste disposal); (ii) the efficient planning of food processing plant (basic concepts, construction and equipment); and (iii) techniques, for controlling the environment of food processing plant (temp. and RH, clean rooms, production of space foods and aseptic packaging). SAC

6 F 295

[Aseptic filling of dairy products into deep-drawn plastics pots.] Das aseptische Abfüllen von Molkereiprodukten in tiefgezogene Kunststoffpackungen.

Linke, D.

Milchwissenschaft 26 (9) 543-546 (1971) [De, en] [Benz & Hilgers GmbH, Düsseldorf, German Federal Republic]

In this modification of the Formseal system, all the operations take place within a tunnel supplied with sterile air at the forming station. The plastics film for the pots leaves the supply roll and enters the tunnel through an H_2O_2 bath. Radiant heating to 130-160°C by electric elements to make the film plastic for forming also completes the sterilization. The pots are blown to shape with sterile air. After filling, a foil lid also sterilized with H_2O_2 is applied and heat-sealed under vacuum. The individual

sealed pots are then separated. The filling unit is cleaned by hand, and sterilized by circulation of disinfectant and then by steaming in a closed circuit at 130°C. The tunnel is cleaned by hand and sterilized with a disinfectant spray. HBu

6 F 297

[New developments in food aerosols.] Neue Entwicklung auf dem Gebiet der Lebensmittelaerosole. [A lecture] Peter, P.

Riechstoffe, Aromen, Körperpflegemittel 21 (12) 454 & 457 (1971) [De, en] [Farbwerke Hoechst AG, Frankfurt/Main, German Federal Republic]

The production of whipped cream in aerosol cans and possible extension of its shelf-life are discussed. Shelf-life was extended from 2-3 wk to ~2 months at 5°C when closed cans filled with the product but without propellant were steam-sterilized by autoclaving at 80-85°C for 18 min and gas introduced through a bacterial filter. Propellants used are nitrous oxide, octafluorocyclobutane (FC 318) and monochloropentafluoroethane (F 115). Use of aerosol packaging for other food products is anticipated. RM

6 F 298

[New developments in food aerosols.] Neue Entwicklungen auf dem Gebiete der Lebensmittelaerosole. Peter, P.

Verpackungs-Rundschau 22 (11) 1532-1534 (1971) [De, en, fr]

See preceding abstr.

6 F 299

[New developments in food aerosols.] Neue Entwicklungen auf dem Gebiete der Lebensmittelaerosole. [A lecture] Peter, P.

Seifen-Öle-Fette-Wachse 97 (23) 927-928 (1971) [De]

See preceding abstr.

6 F 300

[Method for the manufacture of long-life whipping cream in aerosol packs.] Verfahren zum Herstellen haltbarer Schlagsahne in Aerosoldosen.

Anon.

Verpackungs-Rundschau 22 (6) 807-808 (1971) [De, en, fr]

Sterile whipped cream in aerosol packages has been available in W. Germany since the beginning of 1971. The new product is based on a UHT process for making sterile whipping cream and filling it into sterilized aerosol packs.

Destabilization of the cream was not observed. The filling machine has an output of ~1000 aerosol packs/h. The article gives a full description of this new development and the results of a market research conducted prior to the launching of this product. [See also FSTA (1971) 3 7P1110.] IN

6 F 301

[Aseptic packaging in aerosol cans.] Sterilfüllen von Aerosoldosen - Utopie oder Wirklichkeit? Solms-Baruth, H.

Verpackungs-Rundschau 23 (1) 50-52 (1972)

[De, en, fr]

Brief description of the procedure for aseptic packaging of whipped cream in aerosol cans is given. Application over 1 yr has shown that method and equipment are working satisfactorily. In recent market studies, the product in 280-g packs was found to be popular with both the trade and consumer. New products based on sterile packaging in aerosol cans have been developed. IN

6 F 311

New push for aseptics.

Anon.

Modern Packaging 44 (11) 43-45 (1971) [En]

Longer shelf life of foodstuffs without refrigeration can be obtained by sterilization of the product and the package as long as the packaging material used is impermeable. Several laminated materials which can be thermoformed, used as foil or used for the production of pouches or bottles are noted. Material for closing the containers by heat sealing is sterilized by treatment with UV light before sealing. A machine used for forming containers, filling, sterilizing and sealing is described. By substituting a blow moulding station for the forming station, the same type of equipment could be used for bottle production and filling. RPC

6 F 312

[Aseptic packaging of foods in CO₂.]

Schutzbegasung: Keimfreies Verpacken von Nahrungsmitteln unter CO₂.

Huwendick, L.

Ernährungswirtschaft 19 (1) 40, 42 & 44-45 (1972) [4 ref. De]

The atmosphere of CO₂ gas is applied normally shortly before the filling stage of the packaging machine so that the product does not come into contact with air, and filled containers remain in it until sealed. The gas is directed in a laminar flow into the containers by means of a special device. IN

6 J 898

[Aseptic tomato paste processing equipment.]

Fromzel', O. G.; Gersberg, M. L.

Konservnaya i Ovoshchesushil'naya

Promyshlennost' 1971 (4) 7-10 (1971) [Ru]

[Vses. Nauchno-issled. Inst. Konservnoi i

Ovoshchesushil noi Promyshlennosti, USSR]

In 1968 an aseptic tomato paste processing line was put into operation in a canning factory at Volgograd. Tomato paste passes from the vacuum evaporator to the inlet basin, then to the mixer where it is heated to 132°C by steam. The hot paste is heated for 4 min in the sterilization chamber under lower pressure corresponding to a sterilization temp. of 125°C. It is cooled under vacuum (2.7×10^3 to 5.3×10^3 Newton/m²) to 30-35°C and transferred to an empty tank which has previously been cleaned with 2-3% milk of lime at 80°C, then steamed for about 3 h and a sterilized air filter introduced. The line was cleaned with hot water, then with 2-3% caustic soda solution and again rinsed with hot water (120°C for the sterilizer, 100°C for the cooler) and kept under a steam pressure of 4.9×10^4 Newton/m² till work commenced. Temp. of the product in the mixer, sterilization heating time and product quality in the cooler and condenser are automatically controlled and output is ≤ 1500 kg/h. When paste was gradually emptied from the tank no deterioration was observed in the remaining paste after 20-25 days. In a full 25 ton tank the original tomato paste quality was maintained for 6-9 months. STI

6 P 823

[Changes in some vitamins during storage of UHT milk.]

Ferretti, L.; Lelli, M. E.; Miuccio, C.; Ragni, U.

Quaderni della Nutrizione 30 (4/6) 124-133 (1970, publ. 1972) [23 ref. It, en] [Centrale del Latte, Rome, Italy]

Direct UHT sterilization by the Alfa-Laval VTIS, of milk containing 1.8% fat, caused a 6% decrease in thiamin and a 7% decrease in riboflavin; the vitamins were estimated 2 days after the sterilization. Samples of the milk were stored in $\frac{1}{2}$ -l. Tetra Pak containers that included a layer of Al, for up to 3 months at 5, 20 or 37°C in the dark or at 20 or 37°C in diffuse light. Compared with the contents 48 h after sterilization, vitamin A declined by up to 11%, the decreases being slightly larger at higher temp. and in the light. Thiamin was more sensitive to temp. and light; there was little or no loss in 1 month at 5 or 20°C in the dark but up to 35% loss during 3 months in the light. Riboflavin decreased progressively with increasing temp. and light, up to 27% loss. The loss of ascorbic acid was independent of light and temp., increasing to ~50% in 2 months. JMD

6 P 833

[Cultured milk products of long storage life.]

Sauermilchprodukte mit verlängerter Haltbarkeit. Siegenthaler, E.

Schweizerische Milchzeitung 98 (16) 123-124

(1972) [11 ref. De] [Verbandsmolkerei Bern AG, Berne, Switzerland]

After outlining the Aseptomatic system of cultured milks manufacture [FSTA 1969 1 11P1171], the author deals with the Sigotherm aseptic packaging machine [FSTA 1972 4 3P290] and products packaged on this machine at Verbandsmolkerei in Berne. These include yoghurt (storage life 6 wk, cooling necessary), quarg products, fresh cheese, cultured cream and cream quarg-based mayonnaise (storage life 2 months, cooling recommended) and desserts (storage life 4 months, cooling not necessary). A method for checking the effectiveness of sealing of the packages using a methylene blue solution for detecting leaks is outlined. FL

6 P 935

[Special number: milk and cultured milk specialities.] Sonderheft: Milch- und Sauermilchspezialitäten.

Anon.

Molkereizeitung 26 (11) 271-302 (1972) [De]

This special number includes the following papers: Modern methods of cultured milks manufacture, by H. J. Klupsch (pp. 273-278); Aseptic packaging of foods under CO₂, by L. Huwendick (pp. 279-282); and Use of Kombinator 4special heat-exchanger for prolonging the storage life of milk products, by P. von Holdt (pp. 286-289). FL

7 E 283

[The practice of heat preservation. II. Quality and keeping quality improvement of preserved foods by HTST.] Für die Praxis der Hitzekonservierung. II. Qualitäts- und Haltbarkeitsverbesserung von Konserven durch Hoch-Kurz-Erhitzung. Heidtmann, R. H.; Heidtmann, S.; Reichert, J. E. *Fleischerel* 23 (1) 10-11 (1972) [De, en, fr]. [Fachhochschule Lippe, Stiftstrasse, 492 Lemgo, W. Germany]

HTST treatment in food processing is discussed with reference to pre-suppositions for application of the method, for the product, for equipment, and for suitable food containers. Practical application of the method to meat products is outlined, and suitable processing temp. tabulated. OA

7 F 343

Europe packs aseptically in plastics.

Anon.

Food Engineering 44 (3) 105 & 107 (1972) [En]

The use of 'aseptic' thermoform-fill-seal packaging machines developed by Plastimecanique, S.A. Paris, is considered. Roll stock plastics sheet is unwound into a H₂O₂ bath and then formed into containers at >300°F; similarly, roll stock film for lids is unwound into H₂O₂ baths and then sealed to filled containers. The system is being used for milk, yoghurt and other dairy products, as well as fruit juices and fruit concentrates. AB

7 F 345

Guaranteed [Pure Milk Co. Ltd., Montreal] - first with milk in pouches shows its new rotary filling machine.

Macnab, I. C. S.

Modern Dairy 51 (3) 15-19 (1972) [En] [Pure Milk Co. Ltd., Montreal, Canada]

The dairy uses a Bertopack machine for filling milk in sachets with a capacity of 3600 units/h. The 1-qt sachets are combined in batches of 3 in a large outer plastics bag which is sealed and provided with a handle for easy carrying, in a special machine connected to the filler by a conveyor. Pure Pak packaging equipment is used for milk in 1-qt, 1-pint and ½-pint cartons, a Tetra Pak machine for single portions of cream, and 4 machines for filling cream into plastics containers with foil lid. The cream, prior to packaging, is sterilized in a 60 gal/h sterilizer, to extend its storage life. A considerable amount of packaging is in returnable glass bottles. FL

7 P 975

Proceedings of the Nineteenth Annual National Dairy and Food Engineering Conference.

[Conference Proceedings]

United States of America, Michigan State University

102pp. (1971) [En] East Lansing, Michigan, USA: Author

The following papers were read at the conference: Materials handling principles, by R. A. Keppeler (pp. 1-7, 6 ref.); material handling in a modern dairy plant, by R. Kosman (pp. 8-10); Applications of materials handling concepts in cheesemaking, by W. Kraft (pp. 11-13); Applications of feasibility analysis to material handling systems, by J. P. Ryan (pp. 14-27); Food packaging principles, by S. W. Fletcher (pp. 28-35); Aseptic filling of plastics pouches, by H. Smith (pp. 36-37); Filling plastics bags aseptically, by P. J. Duffy (pp. 38-40); Aseptic filling of blow moulded plastics containers, by F. B. Hedges (pp. 41-44); The shelf life of aseptically packaged foods in paper containers, by R. Lisiecki (pp. 45-49); Basic principles in plant layout and design, by A. L. Rippen (pp. 50-55, 3 ref.); New developments in floor materials for food plants, by J. Rieger (pp. 56-58); The process engineer's role in food plant design, by J. B. Anderson (pp. 59-61); An industrial engineering view of food plant layout, by S. M. Dix (pp. 62-66); Basic parameters of food freezing, by D. R. Heldman (pp. 67-78, 3 ref.); Comparative efficiencies and economics of food freezing methods, by A. W. Ruff (pp. 79-83); A linear programming method for optimizing ice cream mix composition, by J. B. Holtman (pp. 84-89); and Advantages of rotary screw compressor for refrigeration applications, by G. C. Briley (pp. 90-102). [See FSTA 3 5P726 & 5P727 for report of 18th conference.] SAC

7 P 1025

Sterilization of milk products containing fat.

Stewart, A. P., Jr.; Stecker, J. F. (Allied Chemical Corp.)

United States Patent 3 628 972 (1971) [En]

In one example, a basic pudding mix containing 70% skim-milk, 15% sugar, 5% starch and 10% water was preheated to 140°F in a tubular heater, a vegetable oil (92°F mp) was injected continuously into the mix through a nozzle as a fine dispersion to produce a fat content of ~5% fat in the final mix, and the mixture was sterilized by steam injection at 278°F, with a 60 sec holding time. After cooling to 85°F, the sterile pudding was packaged aseptically. EJM

7 U 506

[Edible fungi products: sterilized fungi.]

Poland. Polski Komitet Normalizacyjny

Polish Standard PN-71/A-78505 Spp. (1971) [Pl]

This standard replaces PN-65 A-78505 and covers whole or sliced fungi of single (unmixed) spp. intended for the home market and whole or sliced fungi of unmixed or mixed spp. intended for export, sterilized and packaged in jars or cans. Standards on classification, quality categories, description, permitted spp., and size, organoleptic and compositional requirements include the following common to all types and categories: presence of fungi of spp. other than declared, no tolerance; total acidity as lactic acid, $\leq 0.2\%$; cooking salt, 0.5-1.0%; foreign organic matter of animal origin, no tolerance; foreign organic matter of vegetable origin, $\leq 0.03\%$; wt. of strained fungi as % declared wt. of package contents, $\geq 55\%$; As, ≤ 0.2 mg/kg; Pb, ≤ 0.4 mg/kg; Cu, ≤ 10 mg/kg; Zn, ≤ 5 mg/kg; Sn, ≤ 50 mg/kg. Max. permitted mineral impurities range from 0.05% for chanterelles to 0.2% for Tricholoma. Regulations on packaging, storage, sampling and examination are listed. The min. guaranteed shelf life is set at 12 months. SKK

8 A 351

[Radiosterilization of foods.] [A review]

Oka, M.

Journal of the Food Hygienic Society of Japan**[Shokuhin Eiseigaku Zasshi] 11 (4) 229-237**

(1970) [69 ref. Ja] [Tokyo Metropolitan Isotope Res. Centre, 2-11-1 Fukazawa, Setagaya-ku, Tokyo, Japan]

8 F 379

Limitations and advances in canning and metal containers.

Knock, G. G

Food Industries of South Africa 24 (10) 11, 13, 15 & 18 (1972) [5 ref. En]

3 limitations of the canning process are discussed, namely that food cannot be preserved in the uncooked state, that more heat is normally applied to some products than is necessary to cook them and that liquid has to be added to particulate products to assist heat transfer. Advances in canning now taking place which may eliminate the second and third limitations are considered: continuous cookers with rotating cans, flame sterilization, sterilization outside the can, and sterilization methods for heat sensitive products. Developments in metal container manufacture aimed at producing cans of reduced thickness from cheaper materials are considered. VJG

8 F 406

[The Bottle-pack 305 operates with 2 multiple blow-moulding units.] Bottle-pack 305 arbeitet mit zwei Mehrfachformen.

Anon.

Verpackungs-Rundschau 23 (3) 280 (1972) [De]

The Bottle-pack 305 can blow-mould, fill and supply a pilferproof plastics bottles at a rate of 2000 500-ml bottles/h. Virtually all liquids and paste-type foods can be handled. A special model can provide a fully aseptic operation. IN

8 F 408

[Removal of sterilizing liquid from the surface of packaging material from the reel in a sterile chamber.] Vorrichtung zum Entfernen von Sterilisationsflüssigkeit von der Oberfläche bahnförmiger, zu sterilisierender Verpackungsmaterialien im Innern einer Sterilisationskammer.

Schmied, R. (Alpura AG)

Swiss Patent 511 150 (1971) [De]

Residual sterilizing liquid containing chemical agents, e.g. H_2O_2 , is removed from packaging material for milk by sterile air blown through a sterile chamber, the entrained liquid being trapped in a hood with porous walls through which the air escapes. The liquid, which is distributed in the porous material over a great surface, is vapourized by the preferably heated air stream. The removal of the sterilizing liquid from the packaging material is sufficiently effective to meet food regulation requirements. W&Co

8 P 1223

[Topical aspects of cultured milks manufacture.]

Aktuelles zur Herstellung von Sauer Milchprodukten.

Anon.

Deutsche Molkerer-Zeitung 93 (20) 776 & 778-780 (1972) [De]

The following papers presented at the 10th technical conference held in Wolfpassing, Austria, on 20th April, 1972, are summarized in this report: New trends in the use of pasteurized fruit preparations in cultured milks, by H. P. Müller (pp. 776 & 778-779); Use of freeze-dried berries and fruit in milk specialities, by G. Winkel (p. 779); General problems in the manufacture of high-quality cultured milks, by F. T. W. Zscheyge (pp. 779-780); and Aseptic filling of dairy products in deep-drawn plastics containers, by J. Nentwig (p. 780). FL

9 E 370

Let pressure indications work for you.

Ziemba, J. V.; Alikonis, J. J.

Food Engineering 44 (4) 109-110 (1972) [En] [120 S. Riverside Plaza, Chicago, Illinois 60606, USA]

Pressure fluctuations in processing equipment are discussed, with reference to effects on: whipping of egg white, marshmallow and cake batter; continuous cooking of stews, soups and nut confectionery; crystallization of margarine and shortenings; chilling of peanut butter; aseptic canning; gelation of starch in salad dressings and gum drops, and delivery of chocolate to enrobing machines. Causes of pressure fluctuations include non-uniform pumping, changes in infeed temp., sudden pressure changes in valves, abrupt changes in direction of flow, and uneven pressure distribution in extruders. AJDW

9 F 427

[Method for producing germ-free or sterile packaging containers from sheet metal.] Verfahren zur Herstellung keimfreier bzw. steriler Verpackungsbehälter aus Blech.

Laupheimer, M. (Schmalbach-Lubeca-Werke AG)

German Federal Republic Patent Application 1 792 481 (1971) [De]

Metal beverage cans with filling aperture are heat-treated immediately after manufacture, preferably at 80-120°C in a drying furnace forming part of the manufacturing line, their filling apertures being temporarily hermetically sealed, e.g. by a heat-resistant adhesive tape. The cans are suitable for the sterile bottling at room temp. of carbonated beverages (e.g. beer) of fruit juices etc. W&Co

9 F 431

[Novelty and alternative - an economic single-service cream canister.] Novität und Alternative zugleich - der wirtschaftliche Einwegkanister für Sahne und andere Lebensmittel und seine produktgerechte Entwicklung.

Zimmermann, L.

Nordeuropaeisk Mejeri-Tidsskrift 38 (3) 46-52 (1972) [De & Da]

This article deals with the packaging system of Rommelag for milk and cream using plastics [see also FSTA (1971) 3 11F833], mentioning also aseptic filling of milk products into large plastics containers and single-service plastics bottles. The opening of a bottle with UHT milk is by turning a knob, which breaks a weak zone and exposes an opening in the head of the bottle; this opening may be reclosed by insertion of the knob in an inverted position. For use in schools, a drinking straw is supplied with the bottle, being secured to one of its sides. FL

9 F 447

[UHT milk: marketing, economics and aseptic packaging in plastics bottles.] Eine Lanze für die H-Milch. Aspekte, Marketing, Wirtschaftlichkeit und die Verpackung von vollaseptischen Produkten in Kunststoff-Flaschen.

Zimmermann, L.

Molkereizeitung 26 (23) 665-668 (1972) [De]

A brief illustrated description is included of a "bottle-pack" machine for aseptic packaging of milk and other products in plastics bottles. The max. capacity is 7500 units (0.25 l. size)/h, the bottles being made, filled and sealed in continuous operation, starting with granulated or powdered plastics material. FL

9 H 1475

✓ **[Method for continuous cold sterilization of wine using electrophysical procedures.]**

Avakyan, B. P.

Prikladnaya Biokhimiya i Mikrobiologiya 5 (5) 601-606 (1969) [10 ref. Ru, en] [Inst. of Viticulture, Winemaking & Horticulture, Erevan, USSR]

A water-cooled hermetically sealed chamber is described in which a static or flowing layer of wine is exposed under inert gas to ultrasonic radiation from 4 magnetostriuctive generators in the bottom part of the chamber and to UV radiation from 8 lamps suspended from the roof. Optimal conditions of sterilization established in experiments with *Lactobacillus plantarum*, *Acetobacter aceti*, *Saccharomyces vini* and wild yeasts added in pure culture to pasteurized must or wine were: irradiation time, 5-9 sec; wine layer thickness, 2.5-5 mm; throughput, 400-600 l./h; UV intensity, 40 000-90 000 erg/mm²; ultrasonic radiation, frequency 20 kHz, anode tension 7.3 kV. Continuous treatment proved more effective than

batch treatment. Contaminated commercial wines of different types were (i) pasteurized or (ii) treated by cold sterilization. Marked increase in numbers of microorganisms occurred in (i) 15-20 days after treatment, whereas wines subjected to (ii) were sterile after 2 months. No differences were found between (i) and (ii) in titratable acidity, contents of volatile acids, alcohol, sugars or aldehydes; (ii) caused some reduction in contents of tannins and pigments and replacement of glycolic acid by fumaric acid. Taste, bouquet and stability of (ii) treated wines were better than of (i) treated wines. SKK

9 P 1326

[Jellified milks on the Danish market.] Milchgelees auf dem dänischen Markt.

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 38 (3) 57 (1972) [Da & De]

Jellified milks, produced in the Eshbjerg dairy plant, contain ~25% TS, 10% milk SNF and ~2% fat; they are sweetened with sugar and contain carrageenan as the stabilizer. The guaranteed min. storage life of these products, flavoured with vanilla, caramel and liqueur (Grand Marnier) and packaged in Form-seal packs, is 3 wk at 0-5°C. FL

9 P 1330

[Method for producing cultured milk products.]

Verfahren zur Herstellung saurer Milchprodukte.

Roiner, F. X. J.; Grosserhode, J. (Roiner, F. X. J.)

German Federal Republic Patent Application 2 035 675 (1972) [De]

Cultured milk products, e.g. yoghurt, are produced by heating the milk, inoculating it with pure cultures, and incubating it. The incubation is interrupted in pH ranges above the isoelectric value by cooling the still liquid product to ~7°C. The pH of the cooled liquid is then adjusted to 4.6-3.8 by adding lactic acid, preferably in the form of a whey concentrate, or another acid, e.g. citric acid. A stable product is obtained, which after sterilizing by heating (e.g. to 110-120°C) and sterile packaging has a shelf life of up to 1 yr without exhibiting syneresis. W&Co

9 P 1360

[Sterilization of milk by UHT treatment.] [A review]

La Casa Penalver, R.

Revista Espanola de Lecheria 1972 (84) 85-100. (1972) [8 ref. Es]

9 S 1110

[Disinfection of raw hams intended for canning by dipping in boiling solution of NaCl and NaNO₂.]

Balcerek, H.; Wichlacz, M.

Medycyna Weterynaryjna 26 (10) 622-625 (1970) [11 ref. Pl] [Inst. Przemyslu Miesnego, Warsaw, Poland]

(i) 20 unprocessed hams and (ii) 20 hams after pickling and draining were individually dipped for 7 sec in ~40 l. boiling 20% NaCl + 0.2% NaNO₂ solution. The treatment removed ~90% of the microorganisms from (i) hams and ~85% from (ii) hams. 7 cans of ham made from (ii) were analysed after storage for 3 months. The canned ham contained $5.9 \times 10^{-4}\%$ NaNO₂, which was ~3 × more than in canned hams made from the same batch of pickled hams but dipped in boiling water only, but was still well below the prescribed max. of 0.02%. There was little difference in NaCl contents. SKK

9 S 1118

[Evaluation of bactericidal action of UV radiation in can sterilization in meat factories.]

Walkowiak, E.; Aleksandrowska, I.; Watychowicz, I.; Watychowicz, S.; Nictupski, M.; Smolenski, H.

Medycyna Weterynaryjna 26 (2) 89-91 (1970) [8 ref. Pl] [Zaklady Miesne, Bialystok, Poland]

Sterility of inner and outer surfaces of 5 types of can ranging from round 300-g to oblong 10-lb was achieved by exposure for 5 min at a distance of 40 cm at 22°C and 55% RH to radiation from either the Famed-1 bactericidal lamp of Polish manufacture using a Philips TUV 30 radiator at 100 V and 0.37 A, or a quartz mercury vapour lamp at 220 V and 1.7 A. Sterility could not be achieved with the traditional methods used in the Bialystok meat factory. SKK

11 F 548

Aseptic packaging of foods.

Brody, A. L.

Food Technology 26 (8) 70, 72 & 74 (1972) [En]

[Arthur D. Little, Inc., Food & Agri-business Section, Acorn Park, Cambridge, Massachusetts 02140, USA]

Aseptic packaging of foods is discussed with reference to use of container types other than the conventional rigid metal container, e.g. glass, Al containers, flexible and semi-rigid containers such as laminated plastics pouches, formed portion-control plastics containers, plastics bag-in-box, and paperboard cartons. Packaging in retortable flexible pouches and the use of clean room technology are also considered. AA

T1 F 549

Aseptic packaging gives food a new image.

Anon.

Packaging Review 92 (3) 37-40 (1972) [En]

The benefits of aseptic packaging over conventional canning processes are discussed with reference to processing limitations, flavour and marketing benefits and problems with their application to milk, milk-based desserts, meat, vegetables and soups. The operation of aseptic packaging systems including cans, cartons and thermoformed plastics and glass containers and their use in the UK and internationally are discussed. It is concluded that aseptic packaging could provide a new quality image for processed foods. - SAC

11 P 1708

[Method of obtaining sterilized milk.]

Sokolova, L. I.; Morozova, N. M.; Ol'shanova, K. M.; Donskaya, G. A. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti; Union of Soviet Socialist Republics, Moskovskii Tekhnologicheskii Institut Myasnoi i Molochnoi Promyshlennosti)

USSR Patent 340 392 (1972) [Ru]

Impurities are removed from milk, e.g. by centrifuging. Then the fat content is standardized and acidity reduced to 16-17°T to improve protein stability during sterilization, by passing the milk through AN-20 anion exchange resin in the hydroxyl form with a resin: milk volume ratio of 1:20 to 1:40. The milk is then heated to 70-80°C, sterilized by heating for a short time to a temp. of $\geq 140^\circ\text{C}$, cooled and packaged under aseptic conditions. - W&Co

12 F 595

[Prime Pak - an aseptic packaging machine for deep-drawn plastics containers provided with labels.]

Prime Pak - aseptische Maschine, die Plastikbecher mit umlaufendem Etikett tiefzieht.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 38 (7) 142-149 (1972) [De & Da]

A detailed description is given of the construction and operation of Prime Pak machines for forming (by deep-drawing) and sealing plastics cups at a max. rate of 36 000/h. For aseptic operation this machine employs hot H_2O_2 as the sterilizing agent and the forming, filling and sealing stages are carried out in a channel filled with sterile air at a pressure above atmospheric. Cylindrical and slightly conical cups may be provided with paper labels which extend all round the containers and are attached to them during the deep-drawing stage. The filling device is washed and sterilized by the circulation of washing liquids. - FL

12 F 604

New era for metal containers.

Norman, G. F.; Rees, J. A. G.

Food Manufacture 47 (9) 27-28 & 31 (1972) [En]

Developments in processed food containers are outlined under the headings: easy-open tinplate ends, Al easy-open ends, fruit juice cans, beverage cans, adhesively bonded cans, drawn and wall ironed cans, necked cans, welded draught beer cans, tin free steel, beaded cans, and aseptic canning. - HBr

12 P 1791

[Inauguration of a UHT dairy plant in**Neuburg/Donau.]** UH-Milchwerk Neuburg/Donau eingeweiht.

Anon.

Deutsche Molkerei-Zeitung 93 (32) 1264-1267 (1972) [De]

This specialized dairy factory has 2 Uperisation plants with a total hourly capacity of 12 000 l., and there are 2 sterile storage tanks of 20 000 and 7000 l. capacity respectively. Two Tetra brik aseptic machines for 0.5-l. packs and 1 for 1-l. packs are available as well as 4 tetrahedral types with an aggregate output of 27 000 packages/h. The UHT products range includes whole milk, low-fat milk, 'cocoa drink', 'vanillin' milk, cream and buttermilk. The total output of UHT milk products is estimated at ~50 million packages in 1972. - FL

12 P 1803

The manufacture of cultured milk products of prolonged keeping quality.

Anon.

Milk Industry 71 (3) 28 & 30 (1972) [3 ref. En]

This account deals mainly with the Sigotherm aseptic packaging machine and its use for packaging milk specialities in a dairy in Berne. - FL

12 P 1821

[Special issue on the occasion of the 3rd International DLG Dairy Engineering Exhibition.]

Sonderausgabe zur 3ten Internationalen DLG-Fachausstellung für Molkereitechnik.

Anon.

Deutsche Milchwirtschaft 23 (35) 1341-1530 (1972) [De]

This special issue includes the following articles: Installation of production lines in dairies, by G. Damerow (pp. 1366-1375); Basic considerations in the planning of a dairy plant, by G. Weber (pp. 1380-1390); Continuous moisture determination in buttermaking machines (p. 1391); Packaging of milk and milk products throughout the world, by P. Rosenfeld (pp. 1455-1464); The APV-H&K UHT plant UH3 for the production of quality long-life milk, by W. Rössler (pp. 1467-1469); Milk in the school - an important factor in the nutrition of children and young people, by C. Löbbe (pp. 1470-1473). - FL

12 P 1879

Properties of aseptically packed ultra-high-temperature milk. II. Molecular weight changes of the casein components during storage.

Andrews, A. T.; Cheeseaman, G. C.

Journal of Dairy Research 39 (3) 395-408 (1972)
[10 ref. En] [Nat. Inst. for Res. in Dairying,
Shinfield, Reading RG2 9AT, UK]

Gel filtration on Sephadex G-200 in dissociating solvents demonstrated high mol. wt. material in casein isolated at pH 4.6 from stored UHT-sterilized milk, the amount of this material increasing more rapidly at 37 than at 30°C, but being appreciable even on storage at 4°C. Similar high mol. wt. material was found in casein from evaporated and in-bottle sterilized milk and in casein + lactose models, but not in casein heated in the absence of lactose. Results of ultracentrifugation of similar caseins are presented. Changes in the content of NH₂ groups titratable with trinitrobenzene sulphonic acid are also compatible with the suggestion that the Maillard reaction occurs at ambient temp., and over several months, leads to browning and sediment formation due to covalent cross-linking of polypeptide chains. [See FSTA (1971) 3 9P1534 for part I.] JMD

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INTRODUCTION

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would in any case encourage readers to write or telephone us with any comments or queries they may have.

J. NEWTON
ASSISTANT EDITOR

1 E 30

[Method and apparatus for treating disperse systems.] Verfahren und Vorrichtung zur Behandlung von dispersen Systemen. Doevenspeck, H. (Dr. Richard Eifert, Wirtschaftsprüfungs GmbH)

German Federal Republic Patent Application 1 667 029 (1972) [De]

Beverages, e.g. milk and, particularly, beer, are pasteurized and/or sterilized by modifying the electrical charge condition. This is effected by subjecting them to a direct current field, set up by high-tension capacitors and released in pulses by carbon electrodes, the beverage acting as electrolyte. Keeping quality is improved, colour and flavour being retained. Clotting is eliminated as the unstable protein compounds are precipitated during the treatment and removed by filtration. W&Co

1 P 25

Sterilized dairy and analogue products. [Lecture] Glaser, E.

Journal of Milk and Food Technology 35 (8) 464-466 (1972) [En] [Avoset Food Corp., 80 Grand, Oakland, California, USA]

The paper discusses changes taking place in processing, packaging, and distribution of sterilized dairy products. The origins and purposes of present governmental controls are reviewed in the light of these changes. The impact of substitutes for dairy products is discussed, and the need for a new approach to regulating dairy products in a manner which would reflect the changes taking place in the industry is stressed. AS

1 P 50

[Evaluation of some radiations used for milk sterilization.]

Torre, G. dalla

Industria Alimentari 11 (7/8) 71-76 (1972) [8 ref. It, en]

The lethal effects of IR, hertzian, UV, X-ray, γ -ray and cathode ray treatments of milk on the microorganisms present are set out and conditions for the effective use of each are discussed. The IR and hertzian ray treatments, whose action is mainly thermal, offer greater security for the destruction of pathogenic organisms and less risk of injury to the quality of the product than do treatments by UV or ionizing radiations, which operate by altering specific properties of the organisms. Use of such treatments renders essential strict bacteriological control of the treated product prior to its consumption. GLP

1 P 78

[Polybulk milk-packaging machine.] Anon.

Officieel Orgaan, Koninklijke Nederlandse Zuivelbond 64 (34) 792-793 (1972) [Nl]

An improved Polybulk milk-packaging machine (PBM) is described in which volume measurement has replaced wt. measurement used in an earlier version. The single-action metering cylinder has a displacement of 10-25 l., with a choice of 4 stroke lengths. Metering cylinder, filling valve and bag holder are pneumatically operated, and the machine is automatically controlled, though manual control of the individual stages is possible. Fully automatic circulation cleaning is used. The plastics bags are fitted with a screw top or snap with tube. A PMB installed at the CMC-Melk Unie dairy 't Gooi, The Netherlands, is used to package liquid milk, modified milk (Melvite) and buttermilk in 20-l. and 24-l. plastics bags, each bag being placed in a cardboard box or plastics crate. Average output is stated to be 500 units/day. NdeV

1 T 27

[Method and additives for preserving food products.]

Müller, F. L.

Norwegian Patent Application 123 324 (1972) [No]

Raw or heat-treated food products, e.g. fruit compositions or mayonnaise, are preserved by inducing auto-sterilization by adding, without heating, ≥ 1 thickening agent containing molecules with a negative charge. Other fermentation-inhibiting substances may be added. The food product is then stored at a temp. below 10°C, at which any bacteria present are destroyed. A retail package may consist of a plastics twin pouch containing in 1 pouch the gelling agent(s) (e.g. pectin, carrageenan), and in the other ≥ 1 metal salt with gelling properties, e.g. CaCl_2 , dissolved or dispersed in an inert paste. The additives are preferably stirred into the food product in the form of a 2-5% aqueous solution heated to 50-80°C. W&Co

2 F 65

[Various aspects of UHT milk production and aseptic packaging in plastics bottles.] Eine Lanze für die H-Milch. Aspekte - Marketing - Wirtschaftlichkeit und die Verpackung von vollaseptischen Produkten in Kunststoffflaschen. Anon.

Nordeuropaeisk Mejeri-Tidsskrift 38 (9) 196-202 (1972) [De & Da]

The article includes an illustrated description of the bottle-pack-aseptic packaging system. The process involves extrusion of a sterile plastics tube, using pressures of up to 400 atm. and a temp. of approx. 230°C, which passes vertically downwards between 2 endless chains carrying at intervals

moulding units each representing one half of a complete mould. Through synchronized movement, these half moulds meet and close over the plastics tube and mould it by means of sterile compressed air into containers which then are filled with a sterile liquid product by a piston metering unit, sealed and separated; the bottle heads are shaped by means of vacuum. After leaving the machine the containers pass on a conveyor to a trimming station. The hourly capacity is approx. 5000 bottles (0.5 l.) or 4000 bottles of 1 l. size. FL

2 F 80

[Packaging and distribution.]

Dordevic, M.

Mljekarstvo 22 (4) 79-84 (1972) [5 ref. Sh]

[Inst. za Mlekarstvo Jugoslavije, Novi Beograd, Yugoslavia]

The article deals with retail packaging in Yugoslavia of liquid milk and yoghurt, and also other milk products. At present, 1.3% of pasteurized milk is packaged in glass bottles, 55.5% in plastics sachets and 43.2% in Tetra Pak containers; packaging material costs/l. were respectively (old dinars) 1.2 (depreciation), 9-11 and 19-21. Total costs of packaging 1 l. pasteurized milk in glass bottle and plastics sachets were respectively 32 and 40 old dinars; and of plastics packaging $\frac{1}{4}$ l. yoghurt in drawn container and cup they were 70 and 111 old dinars respectively. SKK

2 F 85

New radiation-processing system.

Hoffman, C. R.

Modern Packaging 45 (9) 60-62 (1972) [En] [High Voltage Engineering Corp., Industrial Products Div., Burlington, Massachusetts, USA]

An illustrated description is given of the Compacc irradiation sterilization unit, designed particularly for sterilization of package or film surfaces prior to aseptic filling and sealing. The unit, which can require as little as 25 ft², can be incorporated in existing production lines, the items being fed directly and continuously into the radiation area, irradiated and removed by conveyor. Total hourly operating costs are said to be <\$4/h. Costs of achieving 100% sterilization for various types of food container ranged from 0.56 cents/100 units for 3-in diam. Al cups and lids to 6.70 cents/100 units for quart paper/plastics milk cartons; corresponding costs for films for pouches ranged from 0.39 to 1.3 cents/100 ft². 100% sterilization is claimed for a wide range of microorganisms; 1.0 Mrad doses are effective for non-spore forming spp., while spore-formers require doses of 2.0-2.5 Mrad. HBr

2 F 86

[Bacteriological tests on packaged and stored drinking water.] Bakteriologische Untersuchungen an verpacktem und gelagertem stillen Trinkwasser. Bockelmann, I. von; Bockelmann, B. von *Verpackungs-Rundschau* 23 (9) 1036-1039 (1972) [De, en, fr] [Abteilung Lebensmitteltechn., Univ.,

Total bacterial counts (5 days at 20-22°C) were determined in packaged drinking waters stored for periods up to 26-34 days at "summer" temp. and (one series) 4°C. Types of water used were distilled, standard piped household and special spring waters with high mineral content. Packages used were glass bottle, plastics bottle, gable-top carton and tetrabrik carton (with and without Al lining). With all standard packages initially small counts increased very considerably during storage at summer temp. and some increase occurred even at 4°C; highest numbers were found with spring water. The Al-lined tetrabrik (giving good exclusion of light, air and gases) was better than the unlined tetrabrik, though still not good enough; increases at 12 days were respectively 4300 and >100 000/ml. Heat treatment of water by plate exchanger to give "sterilization" (145°C/4 s with steam injection) or pasteurization (75°C/15 s) reduced counts to very low figures (mean counts <1 and 4/ml at 6 days). Sterilization of the water is indispensable.

However, standard packaging of sterilized water still resulted in some high counts (20% of packages) due to contamination from packaging equipment, but the low counts of sterilized water were maintained by aseptic packaging in tetrabrik. Mean counts (piped water) at 6 days were: no sterilization, standard package >10 000; sterilized plus standard package 22; sterilized plus aseptic package <1/ml. ELC

3 P 273

[Protein-enriched milk and milk products.]

Eiweissangereicherte Milch und Milchprodukte. Solma-Baruth, H.

Deutsche Milchwirtschaft 23 (48) 2057-2058, 2061-2063 (1972) [De] [Milchwirtschaftliche Forschungs- & Untersuchungs GmbH, Hamburg, Federal Republic of Germany]

After outlining methods for the manufacture of milk protein products (casein, caseinates, whey proteins, coprecipitates etc.) the author deals with protein enrichment of various foods that have been developed or are under development at his company and elsewhere. These include 1.6% fat UHT milk enriched with potassium caseinate alone or also with coprecipitates (ratio 1:3), cultured milks (including yoghurt) with added coprecipitates, UHT whipping cream in aerosol packs with approx. 20% fat and increased protein content, spreads based on butterfat (e.g. with 40% fat and 3-5% coprecipitates) and various other foods such as mayonnaise, sauces, bakery products and sausages. FL

3 P 331

[Process for continuously sterilizing a liquid.]

Clark, R. T. (Alfa-Laval AB)

Swedish Patent Application 340 032 (1971) [Sv]

Milk is continuously sterilized by indirect pre-heating to 80-85°C, with intermediate degassing and cooling, and subsequent storage for protein stabilization, followed by rapid, indirect heating under pressure to sterilization temp., e.g. 145°C, and final rapid cooling. Degassing and

cooling is carried out in a vessel that is maintained at a pressure equal to, or higher than, atmospheric pressure but lower than that in the pre-heating apparatus, generated steam being condensed and recycled. The same relative pressure conditions are preferably applied during cooling after sterilization. By this pressure control, the oxygen content of the milk during processing is maintained within a range that favours oxidation of sulphur compounds formed during sterilization, which would otherwise impart a cooked flavour to the milk. W&Co

3 P 374

IDF monograph on UHT milk.

International Dairy Federation.

Annual Bulletin, International Dairy Federation

No. 5, 174pp. (1972) [many ref. En] [Square Vergote 41, 1040 Brussels, Belgium]

This comprehensive dissertation on the principles and practice of UHT processing and aseptic packaging contains the following chapters: Bacteriological aspects, by A. Lembke (pp. 1-5, 11 ref.); Appearance, flavour and texture aspects, by H. Hostettler (pp. 6-34, 109 ref.); Chemical and physico-chemical aspects, laboratory control, by J. Pien (pp. 35-55); The nutritive value of UHT milk, by J. W. G. Porter & S. Y. Thompson (pp. 56-63, 9 ref.); Basic engineering principles, by B. Hallström (pp. 64-79, 4 ref.); UHT processing systems for milk and milk products, by H. Button (pp. 80-99, 51 ref.); Aseptic packaging of UHT milk; container handling and transportation, by T. R. Ashton (pp. 100-116, 3 Ref.); The planning, building, installation, operation and maintenance of UHT plants, by T. R. Ashton (pp. 117-134, 6 ref.); Marketing aspects-economic aspects, by A. Neitzke (pp. 135-157); Legislative aspects, by P. F. J. Staal (pp. 158-164); UHT sterilization and aseptic packaging of milk - problems specific to warm countries, by C. H. Brissenden & P. Rosenfeld (pp. 165-168); and History of the development of UHT processes, by H. Hostettler (pp. 169-174, 31 ref.). CDP

4 C 82

Health hazards of the human environment. [Book]

World Health Organization

387pp. (1972) [many ref. En] Geneva, Switzerland, Author. Price FS 44, £4.40, \$11.00

Part I of this 4-part survey includes a chapter on environmental hazards (biological, chemical and radiological contamination, pesticides, food additives, etc.) to which man is exposed through the medium of food: the principal microbiological contaminants of foods are listed. In a section on food sanitation in Part IV (Public Health principles and practices of intervention), the following aspects are discussed: UHT treatment and aseptic packaging of milk; the advantages and disadvantages of food irradiation; problems relating to the sterilization of food packaging materials and containers; and the contamination of food by migration of components from packaging, especially of the plastics film type. Water pollution due to agricultural practices and, in particular, animal wastes is discussed in several parts of the

4 F 139

Sterilization of packaging material.

Alpura AG

British Patent 1 302 054 (1973) [En]

A device for sterilizing packaging material to be filled with a sterile liquid product is in the form of an inclined vessel containing a sterilizing liquid and having a partition which projects into the vessel, dividing it into 2 interconnected chambers. In operation a web of the packaging material passes continuously through the bath of the sterilizing liquid contained in the vessel and then through a sterile atmosphere to the product filling stage. FL

4 P 452

[Process for treating and packaging milk.]

Vasseneix, A. (Laiterie de Saint-Denis de l'Hotel.)

French Patent 2 098 579 (1972) [Fr]

Milk is sterilized by injection of steam and passed into an expansion chamber, in the centre of which diffused air is introduced into it. The milk is then homogenized and packaged in polyethylene sachets or polypropylene or polyethylene bottles. The packs may be pasteurized by the milk itself, at 80°C for 30 min, and passed into the sterilization chamber, which is at 100°C, for a very short period, the chamber being so arranged that the packs are at 20°C when they leave it. W&Co

4 U 215

Health laws and regulations - Switzerland.

World Health Organization

International Digest of Health Legislation 23 (1) 117-146 (1972) [En] [Geneva, Switzerland]

A selection of Swiss health laws and regulations is presented including the following which relates to food hygiene: Order of 20 Jan. 1971 of the Federal Council to amend the Ordinance on foodstuffs (most important amendments relate to pasteurized milk, UHT milk, skimmed milk, partially skimmed milk, fat-enriched milk, curds and similar products, cream and canned milk products; mushrooms; packaging materials). VJG

5 F 184

Apparatus for the filling of sachets in a sterile atmosphere.

Duboz, D. (SERES Societe d'Etudes & de Realisation d'Emballages Steriles)

British Patent 1 222 239 (1971) [En]

In the machine, sited in a sterile chamber, the product (e.g. milk) is fed continuously into a tube formed by sealing together longitudinally 2 strips of packaging material unwound from 2 spaced, opposed reels. Individual containers are then formed by transversely sealing and cutting the tube. The sterilization of the equipment prior to filling is described in detail. FL

5 F 199

Updates aseptic packaging. I.

Brody, A. L.

Food Engineering 45 (2) 94-96, 99-100, 102, 107, 109-110, 112 (1973) [5 ref. En]

The subject is reviewed under the headings: commercial setting; objective: microbiological destruction; thermal-energy effects. JN

5 P 683

Texas dairy focuses on special products.

Anon.

American Dairy Review 34 (12) 42-44 (1972) [En]

The range of specialities produced in this plant includes yoghurt (in 9 flavours), cultured cream, dips, UHT whipping cream, half-and-half and coffee whitener, and whipping cream in aerosol cans. The packaging machines used in the sterile operation are a Formseal machine for 0.5 oz cups for restaurant use and a Pure-Pak machine for qt, pints and 0.5 pint cartons. H₂O₂ and sterile air are used to provide sterile conditions during the packaging of UHT products. FL

5 P 702

[Zupack-Aseptic packaging machine.] Zupack-Aseptic.

Anon.

Deutsche Milchwirtschaft 24 (9) 302 (1973) [De]

A brief illustrated description is given of the use of a Zupack-Aseptic machine for the packaging of UHT products in a German Dairy plant. The capacity is 1500 cartons/h; the package sizes are 1, 0.5 and 0.25 l. FL

✓ 6 E 189

Canning apparatus.

Guckel, G. A. (James Dole Corp.)

United States Patent 3 707 823 (1973) [En]

An aseptic canning process and apparatus specially adapted for glass jars are described. It consists of a horizontal rotor in an enclosed sterilizer housing, with pockets for the upright containers. Vacuum is applied to the pockets and superheated steam is used to effect sterilization. IFT

✓ 6 E 199

[Continuous sterilization of viscous and semi-solid foods.]

Cronberg, C.; Hallström, B.

Livsmedelsteknik 12 (3) 137-141 (1970) [Sv]

[Alfa-Laval AB, Lund, Sweden]

Descriptions, including schematic diagrams, are given of the main types of equipment for sterilization of viscous and semi-solid foods, viz. steam injection with flash cooling or tubular heat exchanger, and scraped surface heat exchanger. Aseptic techniques are illustrated by reference to the Tetra Pak and James Dole canning systems. HBr

6 F 239

Improvement in or relating to sterile packaging.

Hudson, C. H.; Ashton, T. R.; Cottle, V. C. H.; Jackson, D. (Graham-Enock Manufacturing Co. Ltd.)

British Patent 1 188 123 (1970) [En]

The invention is applicable to machines for packaging milk into sachets formed from a web of packaging material, e.g. polyethylene. The web is drawn from the reel through a sterilizing arrangement, comprising for instance gas jet tubes, where each surface of the material in turn is subjected to sterilization by direct heat from a naked flame whilst the other surface is cooled. The web then enters a sterile chamber where it is formed into a tube which is then made into sachets by transverse sealing with simultaneous filling with the product, e.g. milk. FL

6 F 263

The milk industry looks at plastics.

Anon.

Packaging Review 90 (10) 32-33, 36-37 & 39 (1970) [En]

4 alternative methods of packaging milk are put forward. It is suggested that, due to the decrease in the average number of trips of returnable glass bottles, the alternative packs are now economically competitive. The 4 alternatives are laminated paperboard, blown bottles, sachets and thermoformed bottles. The Tetra Pak, Zupack and Pure Pak systems using laminated paperboard are described. Blown bottles are made either of low- or high-density polyethylene for example BP's Rigidex or ICI's Alkathane. Systems described are manufactured by Sanc, Bekum, Sidal-Remy and Rommelag. Sachet making, filling and sealing systems manufactured by Prepac, Thimonnier, Bertoglio, Finnpack, Hassia Rovema & Hayssen are described. Finally two thermo-formed container systems are described which use rigid polystyrene. These are manufactured by Illig and Brown Machine Co. DBC

6 H 940

[Biological aspects of the sale of water for household purposes.] Biologische Aspekte beim Verkauf von Wasser für den Haushalt.

Dachs, E.

Brauwelt 113 (17) 311-314 (1973) [De, en, fr]

[Doemensschule, Gräfelding, München, Federal Republic of Germany]

Microbiological problems in the packaging of water in plastics bottles are discussed. Total counts of ≤ 3000 /ml have been found in commercial samples. Methods of sterilization and aseptic packaging are briefly described. Water sterilization by 'silvering' is recommended for use when the same filler is to be used for water and beer or lemonade. TUB-IGB

6 P 775

[Abnormal heat resistance of bacterial spores heated by direct injection into steam.]

Cerf, O.; Hermier, J.

Lait 53 (521/522) 23-39 (1973) [17 ref. Fr, en]

Spores of *Clostridium tyrobutyricum*, *Bacillus cereus* and *B. stearothermophilus* were heated in a pilot-plant UHT sterilizer of the milk-into-steam type. Temp. between 102 and 115°C were chosen, and the mean holding time was about 10 s.

Working fluids were buffer, whole milk or skim-milk. Distribution function for residence times was determined by means of methylene blue as a tracer. Theoretical sporicidal effectiveness was calculated for each strain and each temp., using heat resistance values previously determined by heating spores in TDT [thermal destruction time] tubes.

With *Cl. tyrobutyricum* and *B. cereus* the experimental sporicidal effectiveness was always from 1.2 to 7 times higher than the computed effectiveness. Furthermore, with *Cl. tyrobutyricum* spores, the TDT curve is modified: z value increases (13°C instead of 9.8°C in TDT tubes). *B. stearothermophilus* spores heated in the same UHT sterilizer were partially inactivated at a temp. at which heating in ampoules results in activation.

AS

6 P 819

[Heat treatment of finished products.]

Hitzebehandlung von Fertigprodukten.

Siegenthaler, E.

Schweizerische Milchzeitung 99 (24) 193-195

(1973) [4 ref. De] [Verbandsmolkerei, Bern, Switzerland]

After dealing briefly with bacteriological aspects of the pasteurization of cultured milk products after incubation, the author gives processing conditions that must be followed for successful use of the heat treatment. With the exception of milk for quarg, UHT treatment is recommended, direct heating by steam injection at 150°C with 2.5 s holding being preferred to indirect processing at 130°C, and efficient homogenization is considered very important for fat-containing products. Carob bean flour at 0.3-0.5% concn. with or without starch, e.g. soluble starch, at 0.5-1.5% is a suitable stabilizer. A procedure for the manufacture of pasteurized cultured milks with aseptic packaging is given schematically. FL

7 F 290

[Aseptic packaging of UHT milk in plastics bottles.]

Berrebi, H.

Revue de la Conserve Alimentation Moderne No. 11, 173-175 (1972) [Fr]

An installation is described which combines the manufacture of plastics bottles and the aseptic filling with UHT milk. Any thermoplastic material, such as acrylonitrile, polyethylene, polystyrene or polypropylene could be used. The machine can fill 3000-4000 l-l.

7 F 298

Updates aseptic packaging. II.

Brody, A. L.

Food Engineering 45 (3) 107, 110, 113, 117, 119, 122 (1973) [6 ref. En] [Arthur D. Little Inc., Cambridge, Massachusetts, USA]

The effectiveness of liquid and gas package sterilants and of microbiological barriers, in establishing an aseptic environment, are considered. Problems encountered in aseptic packaging are discussed with special reference to flexible packages. [See FSTA (1973) 5 5F199 for part I.] AA

7 F 299

System cuts cost of aseptic packaging.

Havighorst, C. R.

Food Engineering 45 (3) 74-75 (1973) [En]

An in-line form-fill-seal machine modified for aseptic packaging by Filper Corp., San Ramon, California, is described. The firm modified its Model 71-D unit by adding a sterile chamber totally isolated from the environment of the packaging room. Containers are thermoformed, filled and sealed at a rate of 800 × 1/2 oz packs/min, in this sterile chamber. Half-and-half cream packaged by this method and held in unrefrigerated cases was still palatable after 2 months' storage. AA

7 F 300

Aseptic packaging cuts returns.

Henke, D. E.

Food Engineering 45 (3) 93-95 (1973) [En]

The aseptic packaging system employed by Beverly Farms Milk, Pittsburgh, Pennsylvania is described. A Pure-Pak (Model NLL) machine is used to package sterilized product. Equipped with an aseptic filling and sealing unit, the machine also has a system that sterilizes the interior surface of the package immediately after the forming and bottom-sealing process. Carton forming is done on stainless steel mandrels. Products processed and packaged in this way include 'table' cream, whipping cream, egg nog, half-and-half, and chocolate milk. AA

7 P 900

Piston pump for pumping sterile liquids.

Ciboit, J.

French Patent 2 071 145 (1971) [Fr]

This homogenizer, comprising several pistons accommodated in a sealed casing, is designed for pumping sterile liquids and in particular for effecting homogenization in UHT milk production lines in which the product is treated after the sterilization. FL

7 P 944

[Test report on a sterile tank for UHT plants manufactured by Fa. M. Sordi, Lodi, Italy.] Bericht über die Prüfung eines Steriltanks für Ultrahocherhitzungsanlagen -hergestellt von der Firma M. Sordi, Lodi, Italien. Prüfungsstelle für Milchwirtschaftliche Maschinen, Apparate, Geräte und Anlagen an der Bundesanstalt für Milhforschung *Kieler Milchwirtschaftliche Forschungsberichte* 25 (1) 81-89 (1973) [De, en, fr]

The sterile 5000-l. stainless steel tank is provided with an automated supply of sterile air (filtered through a bacteriological filter and sterilized at 300°C) under pressure enabling sterile introduction and removal of UHT milk. Layout, construction and operation of the tank are described in detail. The tank was used in conjunction with a Steriplak 30 L UHT plant and a Tetra Brik aseptic (Tetra Pak) packaging machine for production of packaged UHT milk. Results of keeping quality tests on the milk are given in the preceding abstr. As a result of all tests, no objections are made to official approval of the tank tested. SKK

7 P 961

[Manufacture of cultured milks of long storage life.] (In "Zbornik referatov z konferencie Nova technika a technologia vyroby kyslomliecných výrobkov a ostatných mliecných špecialít".)

Klupsch, H. J. pp. 114-122 (1972) [Sk] Banská Bystrica, Czechoslovakia, Slovenska Vedeckotechnická Spoločnosť pre Potravinársky Priemysel [Lab. pre Mliekarský Priemysel, Bockum-Hövel, Federal Republic of Germany]

The author describes various methods used in the manufacture of cultured milks of long storage life, including aseptic processing, pasteurization after incubation with hot filling of the product into retail containers, and use of starters consisting of thermophilic lactic streptococci plus *Lactobacillus acidophilus* or *L. acidophilus* and *L. bifidus* as in the production of biogarde and bioghurt. These products are made as plain set variants, fruit-flavoured stirred variants or in combination with kefir. Biogarde culture may also be used in the manufacture of cheese. FL

8 F 342

[Aseptically packaged dairy products.] Aseptisch verpackte Molkereiprodukte. Merkelbach, E.

Neue Verpackung 26 (3) 244-248, 250-252, 254-255, 257-258 (1973) [30 ref. De]

The effects of raw milk quality and methods of extending shelf life on the quality of branded products, and the effects of developments in trade and in the dairy industry on the market prospect of long-life milk products are discussed in relation to practices and trends in the Federal Republic of Germany, USA and numerous other countries.

8 F 350

[Aseptic packaging on deep-drawing machines.] Aseptisches Verpacken auf Tiefziehmaschinen. Schmeer, P.

Neue Verpackung 26 (3) 260-264, 266-267 (1973) [De]

An account is given of the packaging materials and machines used for aseptic packaging of milk and milk products and of the technical requirements they must satisfy. ADL

8 F 361

[Packaging of milk and milk products. II.] Verpacken von Milch und Milcherzeugnissen. II. Meier, R.

Molkerei-Zeitung Welt der Milch 27 (20) 625-632 (1973) [De]

In this section the author deals first with packaging machines using either a strip of plastics material or a tube for packaging milk in sachets, giving details of the whole packaging operation, including the product filling arrangements. For aseptic operation the tube of material is irradiated with UV light before entering a sterile chamber. Prior to use, the different parts of the system (the chamber, and milk and air pipes) are sterilized with H_2O_2 , steam and formalin, the treatment times being about 10 or 15 min. Information on packaging into cartons covers the systems using pre-fabricated containers and those making the containers from a strip of packaging material and filling them with the product in a single operation. Finally a very brief account is given of the packaging of ice cream, cheese etc. Technical data of the nature given in the preceding abstr. are tabulated for a large number of different makes and types of machines for packaging liquid, pasty, and particulate solids products. FL

8 H 1208

[Aseptic bottling of wine: technical possibilities.] Technische Möglichkeiten der Weinsterrilfüllung. Anon.

Der Deutsche Weinbau 28 (13) 450, 452, 454-455 (1973) [De] [Weinchem. und Biol. Lab., Seitz-Werke, Bad Kreuznach, Federal Republic of Germany]

Alternative methods of (i) cold filtration sterilization of wine and prevention of re-contamination during bottling, or (ii) heat treatment of wine followed by hot bottling are reviewed. Theoretically both should ensure complete biological stability; in practice problems arise. With (i) maintenance of sterility is not simple and involves elaborate technical procedures; mistakes have serious results. Turbidity in bottled wine due to physical and chemical causes can be prevented by stabilization storage in the cask cellar, but biological turbidity and associated fermentation defects arise from development of living microorganisms. Sterilization of wine by (i) is discussed, including the special physical properties of filter media to prevent the passage of all microorganisms. Small particles of yeast cell debris are absorbed over the filter surface, which in practice limits the flow to $0.1 \text{ l wine/m}^2 \text{ surface}$

Possible filter failures may arise from sudden local impact pressures due to flow restriction or variations in gas pressure. Pressure can be reduced by abstraction of air but can be increased by release of CO₂. Values are tabulated for solubility of CO₂ in wine over a range of temp. and pressures above and below atmospheric. [Continued in following abstr.] ELC

8 H 1209

[Aseptic bottling of wine: technical possibilities.]
Technische Möglichkeiten der Weinstерilfüllung.
Anon.

Der Deutsche Weinbau 28 (13) 450, 452, 454-455 (1973) [De]

[Continued from preceding abstr.] Bottling of sterilized wine involves re-contamination risks. Bottles and corks can be cold sterilized by modern chemical means, but hand corking machines or large mechanized equipment can be sources of infection. With process (ii), precautions are needed to avoid damage to wine quality, and include choice of heat treatment plant (plate type preferred) and avoidance of temp. fluctuations (sensitive automatic control instruments). Hot bottling is more difficult than cold vacuum filling, particularly control of filling level and air/CO₂ pressure balances. Pressure filling is recommended. ELC

8 P 1065

Microbiological studies on market milk. IV.
Psychrotrophic bacterial contamination of head tank contents.

Hamamoto, M.; Kanauchi, T.

Journal of the Food Hygienic Society of Japan [Shokuhin Eiseigaku Zasshi] 10 (6) 414-419 (1969) [30 ref. Ja, en] [Res. Lab., Snow Brand Milk Products Co. Ltd., 3-27-1, Akabanekita, Kita-ku, Tokyo]

In experiments undertaken to determine the source of psychrotrophic contamination in the head tank of the bottling system for UHT milk, it was shown that 280-760 l. air/min was drawn into the vacuum filling system and that 0.68-1.15 l. milk/min flowed back into the head tank during filling of approx. 200 bottles with 180 ml market milk. Psychrotrophic counts averaged 140/l. milk in the head tank initially and 250/l. after introduction of 'flow-back' milk; 'flow-back' milk from the air pipes contained 7800 psychrotrophs/l., and air samples contained an average of 41.3/10 l. From bacteriological determinations at 4 different plants it is concluded that reducing the number of psychrotrophs in plant air and, consequently, in 'flow-back' milk would result in lower contamination of head tank contents. It is suggested that a psychrotrophic count of >6/l. in head tank contents is sufficient to result in the presence of psychrotrophs in all the bottled products. [From En summ.] [See J. Fd. hyg. Soc. Japan (1966) 7 (1) 14-19; (1) 20-25. (5) 409-416 for parts I-III.]

8 P 1066

[Microbiological studies on market milk. V. Constitution of bacterial flora in stored milk.]
Hamamoto, M.; Kanauchi, T.

Journal of the Food Hygienic Society of Japan [Shokuhin Eiseigaku Zasshi] 12 (3) 203-208 (1971) [18 ref. Ja, en]

Changes in the bacterial flora during storage of composite samples of bottled UHT milk at 0-37°C were investigated. 469 isolates obtained before storage were classified into 40 different types with 72% being regarded as psychrotrophs (growth at ≤7°C). After storage at <10°C, 360 strains were isolated, comprising 7 types of which all were psychrotrophic and able to grow at ≤5°C; all 72 strains isolated from milk stored at 0°C had range of growth temp. of 0-32°C, but of 72 strains isolated from milk at 10°C, 21 grew at 0-32°C, 17 at 5-27°C and 34 at 5-32°C. [From En summ.] [See preceding abstr. for part IV.] CDP

8 P 1077

New consumer dairy products in Europe.

Keogh, M. K.

Food Progress 1 (11) 1-2 (1973) [En]

[Moorepark Res. Centre, Fermoy, Co. Cork, Republic of Ireland]

New products which are likely to be of interest to Irish manufacturers are briefly described; they are grouped into cultured or fermented, sweet, and UHT-sterilized dairy foods. CDP

8 P 1127

[Aseptic processing and packaging.] Aseptische Herstell- und Abfüllverfahren.

Frölich, M.

Deutsche Molkerei-Zeitung 94 (16) 599-600, 602 (1973) [De]

The author deals with UHT processing with particular reference to sterile tanks and arrangements ensuring the sterility of their operation, and aseptic packaging machines for plastics containers. FL

8 P 1128

Comparison of milks processed by the direct and indirect methods of ultra-high-temperature sterilization. VI. Effects on sediment formation and clotting with enzymes.

Perkin, A. G.; Henschel, M. J.; Burton, H.

Journal of Dairy Research 40 (2) 215-220 (1973) [21 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, RG2 9AT, UK]

When heat treatments of the same sporicidal effectiveness were given, directly-heated UHT-sterilized milk gave twice as much sediment as did indirectly heated milk after storage at room temp. for 100 days. Both types of process reduced the rate of clotting of the milk with pepsin and rennin, but the effect of the indirect process was markedly greater than that of the direct process. [See FSTA 61071-2, 12P2163 for part V.] AS

8 P 1129

The effect of dissolved O₂ on the changes occurring in the flavour of ultra-high-temperature milk during storage.

Zadow, J. G.; Birtwistle, R.

Journal of Dairy Research 40 (2) 169-177 (1973) [12 ref. En] [Dairy Res. Lab., Div. of Food Res., CSIRO, Melbourne, Australia]

UHT-treated milks containing a range of dissolved O₂ levels were prepared using both direct and indirect UHT processes. The O₂ content of directly processed UHT milk had a marked influence on the changes in the level of cooked flavour in the product during storage over a 12-wk period. At storage temp. of 2° and 20°C, a noticeable improvement in flavour could be achieved by O₂ control. In general, samples with a head-space sufficient to yield an initial P(O₂) of 60-100 mm were most preferred. The effect of O₂ control on samples stored at 38°C was only minor when compared with the marked decrease in acceptability of flavour occurring due to the high storage temp. Directly processed samples stored at 20°C all gelled at 14 wk while those stored at 2°C showed no evidence of gelation after 36 wk. Storage at 38°C gave rapid flavour deterioration, bitterness at 7 wk and gelation at 10 wk. All indirectly processed samples were found to be severely cooked under the conditions employed, and any differences in flavour due to differing O₂ contents were masked by the intensity of this flavour. AS

9 E 291

UHT = Ultrahigh temperature food processing.
Anon.

Agricultural Engineering 52 (5) 264-265 (1971) [En]

UHT processing gives a commercially sterile product without noticeable changes in flavour, texture, or appearance, and has been successfully used for fruit drinks, soups, whipped toppings and various products containing particulate solids. Heat exchangers used may be direct steam injector or surface or tubular types. The importance of adhering to the processing method, and the condition of the processing equipment is emphasized. CIP systems are recommended. Major steps established for use in designing a UHT systems are listed and briefly discussed, together with special ref. to diversion of sub-legal products. PG

9 E 294

Which lipid systems for aseptically processed foods?
Petricca, A. V.

Food Engineering 45 (5) 96-99 (1973) [En] [Glidden-Durkee Div., SCM Corp., Dwight P. Joyce Res. Center, Strongsville, Ohio, USA]

Aseptic ingredient research aimed at adapting lipid systems in existing products to new conditions of aseptic processing and/or designing totally new lipid systems for future aseptic products is discussed. Factors to be considered in selecting the best fat and emulsifier systems for aseptic

solid fat index, lipid crystallography, oxidative stability and fatty acid content of the fats. New formulations for ready-to-use cheese fondues, imitation sour cream and chip dips are presented and details are given of a pilot plant for development of UHT-treated and aseptically canned foods. AA

9 F 369

4aseptic manufacture and packaging.] Aseptische Herstell- und Abfüllverfahren.
Fröhlich, M.

Schweizerische Milchzeitung 99 (43) 341-342 (1973) [De] [Ingenieurbureau Fröhlich, Gümlingen-Berne, Switzerland]

The author deals with various engineering aspects of UHT systems and gives brief information on a machine for aseptic packaging of milk products, e.g. yoghurt, into pre-fabricated containers. The process involves the wetting of the containers with H₂O₂ at approx. 80°C and subsequent drying with sterile air at about 100°C, in a sterile space of the machine, kept under pressure slightly above atmospheric. Cleaning and sterilization is carried out automatically. FL

9 F 378

Packaging of uperised milk: a comparison between polyethylene-coated cartons with and without aluminium foil.

Flückiger, E.

Milk Industry 70 (4) 17-20 (1972) [9 ref. En] [Federal Dairy Res. Inst., Liebefeld-Berne, Switzerland]

See FSTA (1971) 3 7F488.

9 F 391

[A sterilized milk bottle in high density polyethylene, made by extrusion blow moulding on the new DSL 3500 machine.]

Anon.

Emballages 43 (303) 154-156 (1973) [Fr]

An illustrated description and technical data are given for the DSL 3500 Sidel machine for making bottles for packaging sterilized-milk in 0.5-2 l. sizes at throughputs of 3500-2000/l. The bottles weigh from 22 g (0.5 l. size) to 55 g (2 l. size). FL

9 F 393

[Long-life products - aseptic packaging of dairy specialities.] Frischprodukte mit verlängerter Haltbarkeit - Aseptische Verpackung von Milchspezialitäten.

Siegenthaler, E.

Schweizerische Milchzeitung 98 (62) 481-484 (1972) [14 ref. De]

Technological aspects of pasteurized fresh cheese manufacture, and aseptic packaging of coffee cream in 20-ml cups are outlined and details given of the operation of the 'Sigotherm' aseptic packaging machine for cultured milks and other dairy specialities. The initial sterilization before starting up involves spraying the 'sterile' zone of the machine with hot H₂O₂ and circulation of hot

(approx. 100°C) sterile air to evaporate the disinfectant. The strip of the packaging material is sterilized at 150-200°C before being made into containers by deep-drawing and the containers are maintained sterile during the filling and sealing stages in the sterile zone by sterile air at pressure above atmospheric. The Al foil for capping the containers is sterilized by passage through a bath of H_2O_2 and dried by hot air. Products packaged aseptically on the machine included various types of yoghurt, 7 types of fresh cheese products, cultured cream, cream quarg-based mayonnaise and dairy desserts. Guaranteed shelf-life of these products ranges from 6 wk for yoghurt to 4 months for desserts. The importance of packaging material for the shelf-life of aseptically packaged products is pointed out. FL

9 P 1290

Abstracts of papers to be presented at the Sixty-Eighth Annual Meeting of the American Dairy Science Association, Washington State University, Pullman, June 24-27, 1973. Manufacturing section. Enzymes.

USA. American Dairy Science Association
Journal of Dairy Science 56 (5) 622-625 (1973)
[En]

The following papers are included in this section: Curd tension as a measure of the secondary phase of enzymatic clotting of milk, by V. Skura & M. Bakri (M6); Distribution of milk-clotting enzymes between curd and whey, and their survival during cheddar cheese making, by D. G. Holmes & C. A. Ernstrom (M7); Low concentration assay of milk-clotting enzymes, by D. G. Holmes & C. A. Ernstrom (M8); Determination of individual enzyme content in liquid commercial milk coagulating enzyme blends, by R. S. Lim & N. Dinesen (M9); Purification of chymosin (rennin), by M. Bakri & U. S. Ashworth (M10); Increasing flavor in cheese with commercial microbial enzyme preparations, by T. Iwasaki & F. V. Kosikowski (M11); Flavor and chemical changes in blue cheese by microbial lipases, by R. Jolly & F. V. Kosikowski (M12); Trypsin immobilized on tygon tubing, by G. F. Senyk, E. C. Lee & W. F. Shipe (M13); Operational stability of glass-bound trypsin, by E. C. Lee, G. F. Senyk & W. F. Shipe (M14); Heat stable protease from *Pseudomonas fluorescens* P26 degrades ultra-high temperature pasteurized milk, by C. H. White & R. T. Marshall (M15); Proteolytic enzymes in ultra-high temperature treated and aseptically canned 10% cream, by W. S. Cheng & C. S. Gelda (M16); and Purification and effects of enzyme concentration on properties of sulfhydryl oxidase, by H. E. Swaisgood & V. G. Janolino (M17).

CDP

10 F 454

Aseptic packaging of milk.

Bockelmann, B. von

Alimenta 12 (3) 119-126 (1973) [43 ref. De]
[Tetra Pak Inst. AB, Lund, Sweden]

Sterilization procedures used on various materials are outlined. Hydrogen peroxide and hot sterile air treatment as used in the Tetra Pak and Tetra Brik systems is particularly effective, reducing surface contamination of the plastics used to 0.02-0.05 organisms/cm² of which only 3% are sporeformers. Tests of this treatment conducted on the plastics contaminated with *Bacillus subtilis* spores indicated survival of only 1 spore/10⁶-10⁷ applied. GTP

10 H 1564

[Salzburg: XIV Congress of the European Brewery Convention. Summaries of papers.]

European Brewery Convention

Brasserie Malterie Europe 23 (6) 100-124 (1973)
[Fr]

[Continued from preceding abstr.] Production of volatile compounds during fermentation, by S. Lie & D. Haukeli; Formation of volatile S compounds, by H. J. Niefind & G. Späth; Formation of C₄-C₁₀ fatty acids during fermentation induced by wild yeasts, by V. Arkima; Technological effects on the metabolism of glycogen by bottom-fermenting yeast, by B. Mändl, R. Heinrich & A. Piendl; Yeast stock and stability of yeast head during bottom fermentation, by A. J. Conde & M. Velazquez; Study of turbidity with a Doppler light diffuser, by S. Claesson & E. Sandegren; Observations of factors affecting the characteristics of beer foam, by H. W. Archibald, J. P. Weiner & L. Taylor; Stability and adhesiveness of foam, by W. J. Klopper; Brewing trials with ochratoxin and citrinin, by P. Giertsen, F. Myken, P. Krogh & B. Hald; Beer contaminants produced by mould strains, by M. Amaha, K. Kitabatake, A. Nakagawa, J. Yoshida & T. Harad; New contributions to the problem of aseptic racking, by J. Posda, J. G. Galindo & F. L. Palomero; Results of gas chromatographic study of volatile compounds, especially 2-methyl-2-butene and isoprene, in bottle head-space, by H. Zenz; Pollution problems in brewing, by H. Meyer; [Continued in following abstr.] JA

11 F 467

'Truly Aseptic' packaging system developed.

Cukor, C. W.

Food Engineering 45 (6) 135-136 (1973) [En]
[Dairy and Related Ind., Plastic Products Group, Mead Packaging, Atlanta, Georgia, USA]

Details are given of research carried out to develop a completely aseptic packaging system. The Prime-Pak system described involves use of H_2O_2 , a shrouded chamber for the heating, forming, filling and sealing areas of the machine, sterility monitoring, and a special polystyrene/PVDC packaging material with outstanding moisture and O₂ barrier characteristics. AA

12 E 439

Launches pilot plant for aseptic processing.

Anon.

Food Engineering 45 (8) 122-123 (1973) [En]

The aseptic processing developmental laboratory and pilot plant at Chemetron's Votator Division, Chicago are described; emphasis is being placed on aseptic handling, processing and packaging of foods with a particle size larger than $\frac{1}{2}$ -in cube. AA

12 F 520

FDA's view on chemical sterilization of aseptic packaging containers.

Riester, D. W.

Food Technology 27 (9) 56, 62 (1973) [2 ref. En] [Office of Tech., FDA, 200 C St., SW, Washington, DC 20204, USA]

FDA's view is that chemical sterilization of containers for aseptic packaging is relatively new in the United States and must be proven safe before being adopted commercially. The author describes how information will be gathered and evaluated. IFT

12 F 521

Clean air systems for aseptic packaging.

Agnew, B.

Food Technology 27 (9) 58, 60, 62 (1973) [2 ref. En] [Agnew-Higgins Inc., 7091 Belgrave Avenue, Garden Grove, California 92614, USA]

This article discusses the function, operation and benefits of laminar flow clean air systems as they relate to food packaging. IFT

12 F 522

Aseptic filling in flexible bags.

Duffy, P. J.

Food Technology 27 (9) 52-54 (1973) [2 ref. En] [Gaulin Corp., 44 Garden St., Everett, Massachusetts 02149, USA]

This article describes the Gaulin Aseptic Bag Filler and its operation, as well as tests to ensure sterility and choice of a suitable bag design. IFT

12 F 529

How asepsis is achieved in food packaging.

Anon.

Food Engineering 45 (8) 87-88, 90, 94 (1973) [En]

Techniques and equipment reported include: an aseptic milk packaging machine; bulk filling of bags in a pressure/vacuum chamber; bag-in-box aseptic packaging of tomato products; aseptic operation of a plastics form-fill-seal machine; and aseptic packaging in paperboard containers. AA

12 F 543

Aseptic system sterilizes pouches with alcohol & UV.

Doyen, L.

Food Technology 27 (9) 49-50 (1973) [En] [Thimonnier & Cie, 79 Rue de Bourgogne, 69 Lyon 9, France]

This article describes an aseptic packaging machine which uses alcohol and UV radiation for sterilization of the machine and flexible packaging film. IFT

12 F 545

Aseptic packaging in paperboard containers.

Hedrick, T. I.

Food Technology 27 (9) 46-48 (1973) [En] [Dept. of Food Sci. & Human Nutr., Michigan St. Univ., East Lansing, 48823, USA]

This article describes the Pure-Pak system for aseptically filling food products into paperboard/plastics/foil containers. IFT

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INTRODUCTION

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J. NEWTON,
ASSISTANT EDITOR

1

[Aseptic forming, filling and sealing.]

Reinfektionsfreies Formen, Füllen und Verschliessen.

Anon.

Deutsche Milchwirtschaft 24 (38) 1559-1560 (1973) [De]

An illustrated description is presented of a new packaging machine 'DOGAform 81', manufactured by Fa. Ganzhorn + Stim, dealing particularly with precautions taken to eliminate contamination with microorganisms. Packaging materials for the containers and lids are sterilized by passing through H_2O_2 baths followed by drying. The moulding of containers is by sterile air. The machine is largely enclosed and a pressure above atmospheric is maintained to prevent infiltration of microorganisms. Automatic cleaning and sterilization of the machine are outlined. FL

2

Practical aspects of aseptic processing.

Rees, J. A. G.

Food Manufacture 48 (9) 48-51, 86 (1973) [En]
[Food Tech. Dept., Metal Box Co. Ltd., Baker Street, London, W1A 1AN, UK]

The characteristics and operation of a pilot-scale aseptic processing and packaging plant are described, with reference to product sterilization (by means of a swept surface exchanger, a plate heat exchanger or direct steam injection), aseptic canning, cleaning and sterilization of the equipment, formulation of products (including starch-based desserts and sauces, flavoured milk drinks, fruit and cream desserts, creamed soups and fruit juices), and container-product interaction. The present and potential market for aseptically-processed foods in the UK is briefly discussed. AJDW

3

Aseptic packaging in rigid plastic containers.

Toledo, R. T.; Chapman, J. R.

Food Technology 27 (11) 68, 70, 72, 74, 76 (1973) [4 ref. En] [Food Sci. Dept., Univ. of Georgia, Athens, 30602, USA]

This article describes the operation of the Prime-Pak form, fill, and seal packaging machine, its adaptation to aseptic packaging of foods, and the microbiological testing done to demonstrate the effectiveness of aseptic operation. IFT

4

[Production of Floralp coffee cream in portion packs in the Gossau butter factory.] Floralp-Kaffee-Rahm; Die Herstellung von haltbarem Kaffee Rahm in Portionen in der Butterzentrale Gossau.

Kaufmann, C.

Schweizerische Milchzeitung 99 (86) 655-656 (1973) [De] [Gossau/SG, Switzerland]

Production of UHT coffee cream with aseptic packaging in portion packs in Gossau, Switzerland, is briefly described with particular reference to the aseptic machine used. In the machine, developed by Fa. Hamba and Ing. Büro Frölich, prefabricated containers are first sterilized by injection of H_2O_2 , dried with sterile air, filled with UHT-treated cream and sealed; the lids are sterilized by IR radiation. The whole operation takes place in a sterile part of the packaging machine, where aseptic conditions are obtained initially with H_2O_2 and maintained by provision of sterile air under pressure above atmospheric. The capacity is 18 000 packs/h. FL

5

[Tests of the efficiency of preventing microbial contamination in a plant for aseptic packaging of milk.]

Haridon, R. I.; Cerf, O.

Revue Laitiere Francaise No. 309, 421, 423, 425, 427, 429, 431, 433; No. 310, 487, 489, 491, 493, 495, 497 (1973) [Fr, en, de] [Inst. Nat. de la Recherche Agronomique, Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, F-78350 Jouy-en-Josas, France]

The efficiency of various measures taken to prevent access of microbial contaminants into a prototype aseptic packaging plant was tested using *Bacillus subtilis* and *B. stearothermophilus* spores. The packaging unit was connected to a prototype UHT-treatment plant described previously [FSTA (1973) 5 6P775]. Initial sterilization of the filling space involved circulation of saturated vapour from a polyalcohol mixture at $>120^\circ\text{C}$, and rinsing with sterile distilled water; hydraulic locks and joints were disinfected with sodium hypochlorite. The high-density polyethylene bottles were manufactured non-aseptically and sterilized by radiation treatment of 2.5 Mrad. It is estimated that, when functioning normally, the prototype packaging plant would produce approx. 0.25% non-sterile bottles of milk. CDP

6

[Influence of single and associated strains of *L. bulgaricus* and *Str. thermophilus* as well as milk treatments on the production of acetaldehyde in yoghurt.]

Bottazzi, V.; Battistotti, B.; Montescani, G.
Lait 53 (525/526) 295-308 (1973) [22 ref. Fr, en] [Istituto di Microbiol. Lattiero-casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

7 strains of *Lactobacillus bulgaricus* and 3 of *Streptococcus thermophilus* isolated from commercial yoghurt were tested for sugar fermentation, serological group, DNA base composition and acetaldehyde production. 4 of the *L. bulgaricus* strains produced only limited amounts of acetaldehyde in UHT milk which had a pH of 4.15-4.38, but produced greater amounts in autoclaved UHT milk which had a pH of 3.75-3.87; they produced considerably more acetaldehyde in UHT milk when grown in association with *Str.*

thermophilus. During production of yoghurt using a combination of several *L. bulgaricus* and *Str. thermophilus* strains, production of acetaldehyde became evident when the pH of the yoghurt reached 4.9 (after approx. 2.5 h incubation at 42°C), increased rapidly until the pH reached 4.25-4.35 (after 3.5-4 h), and stabilized when the pH reached approx. 4.0. CDP

7

Aseptic packaging - a new market for flex-packs. Sacharow, S.

Food in Canada 33 (11) 33, 40 (1973) [En]
[Packaging Div., Reynolds Metals Co., Richmond, Virginia, USA]

Aseptic packaging is discussed with reference to: development of aseptic processing; product sterilization; package sterilization; product filling and sealing; market for flexible packages; lidding materials; paperboard laminates; and flexible pouches. AA

8

Packaging of milk and milk products. An IDF packaging seminar held in Prague during 23rd-25th May, 1972.

International Dairy Federation
Annual Bulletin, International Dairy Federation
No. 71, 186pp. (1973) [En, Fr] [Square Vergote 41, 1040 Brussels, Belgium]

At the 1st session of the seminar (pp. 3-37, En, 89-127, Fr), papers presented and discussed were: General introduction, by P. Rosenfeld; Packaging of liquid milk (including condensed and evaporated milk), by T. R. Ashton; Packaging of butter, by G. Ducouret; Packaging of cheese, by J. J. Mol; and The packaging of fresh products with extended keeping quality - the aseptic packaging of milk specialties, by E. Siegenthaler. Session B (pp. 38-61, 128-154) covered the following aspects: Specifications for packaging materials for fluid milk, by P. R. Poulsen; Legal regulations affecting the packaging of dairy products, by R. F. van der Heide; and The packaging of dairy products (including fluid milk) in the future - the retailer's view, by L. Nygren. Session C (pp. 62-86, 155-183) covered the following: Disposal of packaging wastes in the dairy industry, by A. E. Higginson; Some aspects of flexible protective packaging of dried foodstuffs in humid tropics, By J. Hanousek; and Present situation of the packaging of dairy products in Czechoslovakia, by J. Siman. The session ended with a proposal for an IDF specification concerning packaging materials for liquid milk, and official conclusions from the seminar. CDP

9

Fruit pudding.

Stewart, A. P., Jr.; Drier, C. R., Jr. (Allied Chemical Corp.)

United States Patent 3 770 461 (1973) [En]

A starch pudding base mixture is blended with an edible acid-flavouring base to form a fruit pudding which is aseptically canned. IFT

10

[Keeping quality of aseptically packaged pasteurized milk during storage at 4 and 8°C.] Mourgues, R.; Auclair, J.

Lait 53 (528) 481-490 (1973) [13 ref. Fr, en]
[Lab. de Bact. Laitiere, INRA, 78350 Jouy-en-Josas, France]

14 samples of raw milk of varying bacteriological quality were laboratory pasteurized at 75°C for 15 s (pasteurization at 72 or 80°C gave similar results), cooled immediately to about 15°C, and standard plate counts (SPC) were then made immediately and during storage at 4 and 8°C. During storage at 4°C, the SPC gradually decreased; this was followed by a rapid increase with appearance of flavour defects after 30-73 days of storage; samples stored at 8°C showed similar changes except that flavour defects appeared after 10-35 days. The lower the SPC immediately after pasteurization, the greater was the time before appearance of flavour defects at 8°C, but this relationship was less evident in samples stored at 4°C. The organisms responsible for flavour defects in milk stored at either temp. were *Bacillus cereus*, *B. licheniformis* and *Microbacterium* spp. CDP

11

Container sterilization in the aseptic canning process.

Swords, B. J.

AIChE Symposium Series 69 (132) 100-102 (1973) [En] [James Dole Corp., Redwood City, California 94063, USA]

Aseptic canning of foods is discussed with special reference to the Dole Aseptic Canning System. This method entails the use of superheated steam at pressures slightly above atmospheric, eliminating the requirements for pressure vessels and complicated gate-valves. Details are given of the method of sterilizing the container and lid, and of the method of sealing-in the aseptic system. AA

12

Improvements in or relating to a method of aseptic packing or conditioning of a product.

E. P. Remy & Cie

British Patent 1 339 995 (1973) [En]

The machine for aseptic packaging of food products such as milk in plastics containers comprises a sterile chamber in which the pre-formed containers, e.g. blow-moulded bottles, are opened, filled with the sterile product, and sealed. The chamber may be maintained at a pressure slightly above atmospheric to prevent entry of outside air. Locks are provided at both the entry and exit ends of the chamber. Containers coming from the blow-moulding machine are sterilized externally by a sterilant spray in the entry lock. FL

13

[Continuous manufacture of stirred yoghurt using special starches.] Kontinuierliche Herstellung von Rührjoghurt unter Verwendung von Spezialstärke. Bartenschlager, F. X. *Deutsche Milchwirtschaft* 25 (1/2) 29-31 (1974) [De]

Various aspects of the use in stirred yoghurt manufacture of starches and their characteristics are discussed. Dispersion of starches in cold milk presents no problems, using in continuous production processes for instance a highly concentrated milk/starch suspension (ratio about 3.5:1) at as low a temp. as possible and ensuring intensive agitation. Special starches are said to retard-protein degradation in the finished products during distribution. Information is also given briefly on the treatment of coagulum in stirred yoghurt manufacture, pasteurization of yoghurt after incubation, and on packaging techniques (aseptic and hot-filling). FL

14

Improvements in or relating to an apparatus for aseptic packing or conditioning of products, notably food products.

E. P. Remy & Cie

British Patent 1 339 996 (1973) [En]

A rotary-type machine for aseptic packaging of various products, especially milk products (e.g. liquid milk) and using the principle of the enclosed sterile chamber, is covered. FL

15

Aseptic packaging in plastics - new opportunities for milk-based desserts.

Anon.

Packaging Review 93 (10) 72, 75-76 (1973) [En]

It is pointed out that the rapidly-growing market in the UK for yoghurt and dairy desserts is based upon chilled products having a relatively short shelf-life. Aseptic packaging of a sterilized product would, however, remove the need for refrigeration and greatly extend shelf-life. Liquid products, or particulate products of small particle size, are very suitable for UHT sterilization, but large particles (e.g. fruit, nuts) would require separate sterilization and introduction. Although plastics containers

compare favourably with metal or glass containers in respect of shelf-life, it has been shown that aseptic packaging of a pasteurized product in standard plastics pots will increase shelf-life by several days, and if the product is sterilized a shelf-life of 40-50 days is possible at ambient temp.; a high barrier pack (e.g. by incorporating a layer of PVDC) would increase shelf-life even further. Advantages of the thermoform-fill-seal systems now widely used in France, Switzerland and Germany are outlined, but for a number of reasons (which are discussed) these are less suitable for conditions in the UK dairy and food industries. It is considered that particular UK needs are likely to be met by machines which fill UHT sterilized products aseptically into pre-made plastics pots. Two machines of this type have now been developed; both use H₂O₂ as the container sterilant. ELC

16

New contributions on the aseptic filling of beer.

Posada, J.; Galindo, J. G.; Palomero, F. L.

Proceedings, European Brewery Convention 14th Congress, 399-418 (1973/publ. 1974) [22 ref. En, de, fr] [El Aguila SA, Madrid, Spain]

The major part of this study was concentrated on the filler. 2 main aspects are considered: sterilization and atmospheric air. Bottles filled initially showed much greater contamination than those racked in the following period. Good results were obtained with recirculating systems for cleaning the fillers, with special systems for each type of machine, in order to obtain complete sterilization of inner and outer parts of the racker. A new filling method is described which permits separation of atmospheric air from the empty bottle from counterpressure air. In this way it is possible to keep sterile the air or CO₂ which is inside the filler in continuous contact with beer. Principles of laminar flow of sterile air were utilized to enable the corker to work in an atmosphere protected against exterior pollution. With regard to keg filling, the importance of lactobacilli contaminations from the container due to lack of sterilization is stressed. Quality control using selective media and recent techniques for cultivating lactic rods are discussed. It is considered that these techniques could be followed without difficulties in quality control laboratories in breweries. AS

17

[Novel dairy products.] [Review]

Cywinski, T.

Przemysł Spożywczy 27 (12) 550-551 (1973) [10 ref. Pl]

This review covers methods of increasing the shelf-life of dairy products (secondary pasteurization, use of stabilizers, CO₂ gassing, aseptic packaging), and describes several dairy products, including fermented beverages made from skim-milk and buttermilk, cows' milk kumiss, and ready-made desserts. HBR

18

[Control of the sterility of milk products packaged on a Remy aseptic machine in semi-industrial operations.]

Haridon, R. P.; Cerf, O.

Revue Laitière Française No. 313, 763, 765, 767, 769, 771, 773 (1973) [12 ref. Fr, en, de] [Inst. Nat. de la Recherche Agronomique, Sta. Centrale de Recherche Laitière, 78350 Jouy-en-Josas, France]

The Remy prototype aseptic packaging system described previously [FSTA (1974) 6 2P135] was used on a semi-industrial scale to fill 50 214 bottles in 38 batches at a weekly rate of 4 batches of approx. 1300 bottles each. Results of sterility tests showed the following: 0.47% had defects of mechanical origin, 0.35% being visible immediately after filling and the rest after incubation (30°C for 21 days or 44°C for 7 days); 0.008% had microbial defects of undetermined origin, detected after incubation; 0.128% were unacceptable to the consumer. Results of sterility tests were 30 × better than those obtained when the system was used experimentally, and compared favourably with results reported for other approved machines, most of which are already in industrial use. FL

19

Aseptic packaging of foods.

Robinson, D.

United States Patent 3 643 586 (1972) [En]

A method for producing aseptically packaged foods is described. The food is first sterilized and then packaged in presterilized containers in a sterile environment. The method is suitable for virtually all perishable foods. Specific examples quoted are whole milk and chocolate-flavoured pudding. HBr

20

[Packaging of perishable and UHT milk products in plastics bottles.] Das Abpacken von verderblichen und haltbaren Milcherzeugnissen in Kunststoff-Flaschen.

Zimmermann, L.

Deutsche Molkerei-Zeitung 95 (9) 274-278 (1974) [De] [Rommelag Maschinen GmbH, Oeffingen, Federal Republic of Germany]

In the Bottle-pack-aseptic system, the bottles are blow-moulded from plastics granulate at material temp. of about 240°C using sterile air, filled with UHT milk and sealed. Designed for the production of UHT coffee cream in portion packs is a special production line comprising essentially a small sterilizer with a capacity of 50-150 l/h and a Bottle-pack plant for aseptic packaging into plastics tubes (7.5 or 15 ml vol.). The plant has a capacity of 10 000-12 000 units/h. and occupies an area of approx. 10 m². A single-service feed bottle with aseptically packaged Uperised milk and provided with a disposable sterile teat features a special closure with a needle which on screwing downwards

pierces a seal and allows the contents to flow into the teat cavity. The bottle is made in 90-120 ml capacities. FL

21

[New developments in food packaging in plastics films with large exclusion of bacteria.] Neue Entwicklungen auf dem Gebiet der keimarmen Abfülltechnik von Lebensmitteln in Packmitteln aus Kunststoff-Folien.

Hartmann, G.

Deutsche Molkerei-Zeitung 94 (40) 1611-1613 (1973) [4 ref. DE] [Kalle AG, Wiesbaden-Biebrich, Federal Republic of Germany]

Various aspects of plastics films and their properties are discussed and O₂ and H₂O permeabilities of several types of film (PVC, polystyrene, acrylo-nitrile-butadiene-styrene) and of composite films are tabulated. Brief information is given on bacterial contamination of Doypack packages (made of composite material including Al foil). Of 45 packages (250 ml size) tested, 39 were sterile and 6 carried only 1 microorganism. However, contamination occurred when the packs were prepared for filling by inflation with filtered air in the filling machine. It is pointed out that in spite of low initial bacterial contamination of the packages, sterilization with a suitable sterilant, e.g. H₂O₂ or ethyl alcohol, is necessary. FL

22

A checking method of fluid milk products in closed packages.

Moisio, T.; Kreula, M.

Milchwissenschaft 28 (8) 477-478 (1973) [En, de] [Valio Lab., Kalevankatu 56 b, 00180 Helsinki 18, Finland]

An instrument developed at the Valio laboratory, Helsinki, for automatic quality control of aseptically packaged UHT-treated milk products, operates on the basis of electrical registration of changes in the hydrodynamic properties of the product, such as viscosity due to microbial activity. The instrument checks each package separately and automatically rejects spoiled packages. Capacity is reported to be 6000-8000 packages/h. ADL

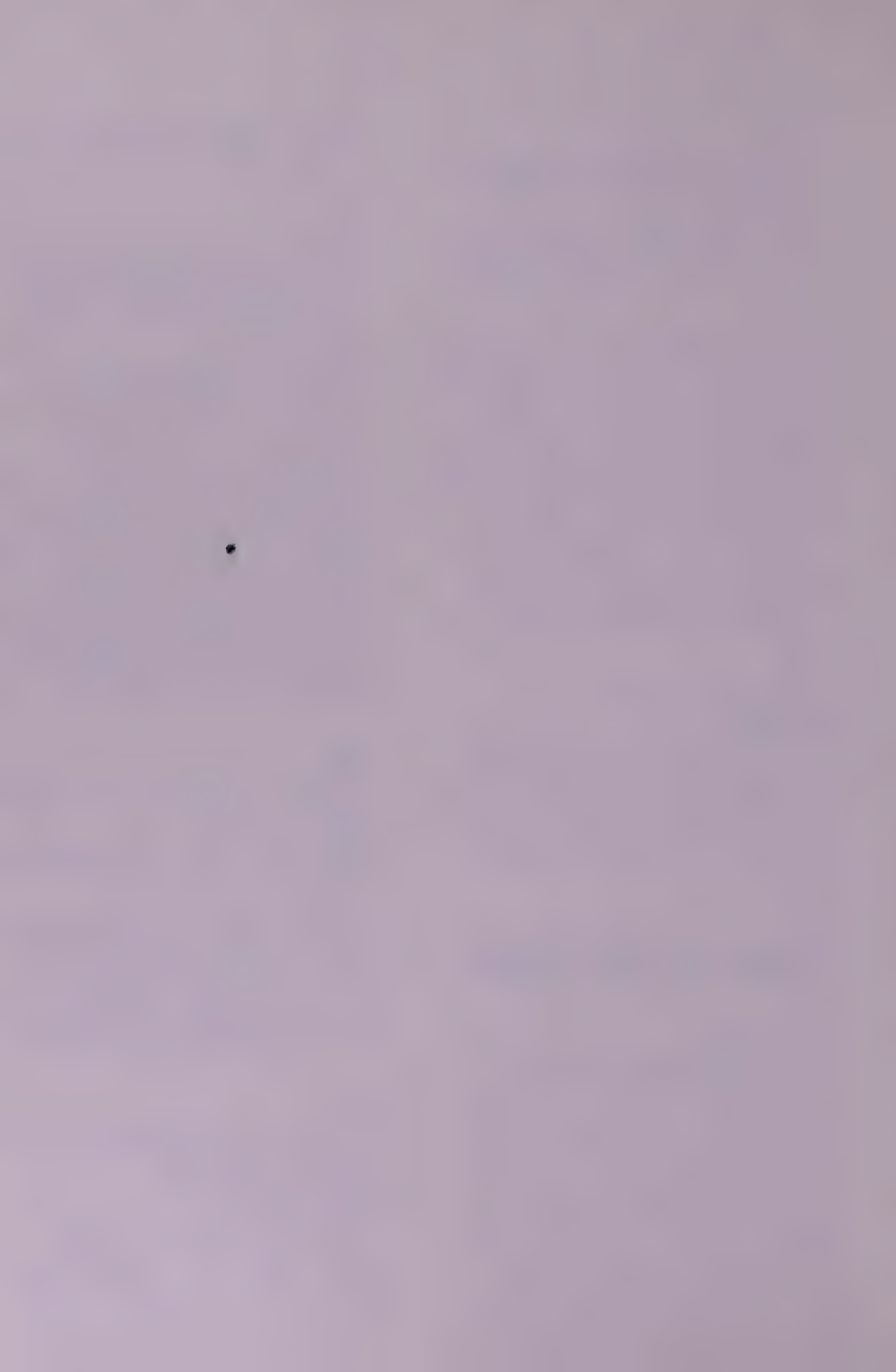
23

[Temperature conditions during distribution of milk packaged in Pure Pak cartons.]

Sköldebrand, C.; Hallström, B.

Nordisk Mejeriindustri 1 (2) 54-57 (1974) [Sv] [Lund Univ., Alnarp, Sweden]

In an experiment similar to one already performed with Tetra Brik containers [FSTA (1973) 5 7P941] 3%-fat standardized market milk and 0.5%-fat skim-milk were cooled to 1, 3 or 5°C prior to filling in 1-l. Pure Pak cartons. The filling machines were of the ZP (7200 packs/h) and QP (4500 packs/h) types. Average temp. rises occurring in the milk were found to be as follows:



during transfer from tank to filling machine, + 0.4°C; within the ZP machine, + 0.8°C; and within the QP machine, + 1.1°C. After 18 h cold storage the temp. was reduced to 2-3°C in all cases. It is concluded that the temp. of Pure Pak milk is unlikely to exceed +8°C (the max. permitted under Swedish legislation) within the dairy, but that the precooling temp. should be as low as possible or else insulation in transport and retailing should be improved to minimize risks after the milk has left the dairy. The effects of the 3 precooling temperatures on the foaming properties of the milk, the accuracy of filling and the leakproof quality of the Pure Pak cartons were also studied. ADL

24

Abstracts of papers presented at Second Annual Research Conference (Cork, September 19 and 20, 1972) on Food Science and Technology.

Irish Republic. An Foras Taluntais

Irish Journal of Agricultural Research 12, Supplement xvi-xxv (1973) [En]

[Continued from preceding abstr.] Preliminary investigations on the utilisation of effluent from a meat-processing factory, by A. J. McLoughlin (p.xvi); Functional properties of proteins for food, by R. A. M. Delaney & N. Hurley (pp. xvi-xvii); An examination of some bacterial proteases, by P. J. Griffin & W. M. Fogarty (pp. xvii-xviii); Comparative study of rennins and pepsins from various species, by P. A. O'Leary & P. F. Fox (pp. xviii-xix); Comparative evaluation of some rennet substitutes, by J. A. Phelan (p. xix); Relationship of the lipase and lipoprotein lipase activities of bovine milk, by M. C. T. Hoynes & W. K. Downey (p. xx); Application of gel filtration to whey processing, by R. D. Kearney, R. A. M. Delaney & J. K. Donnelly (pp. xxi-xxii); Denaturation status of whey protein concentrates, by R. Kennedy & A. C. O'Sullivan (pp. xxii-xxiii); Nutritional status of whey protein concentrates, by A. C. O'Sullivan & R. A. M. Delaney (p. xxiii); Influence of holding time on turbidity test response of UHT milks, by J. M. Walsh, A. C. O'Sullivan & E. J. M. O'Callaghan (p. xxiv); and Diacetyl production by mixed strain starter cultures, by B. Walsh & T. M. Cogan (pp. xxiv-xxv). CDP

25

[Organoleptic changes in UHT milk during storage.]

Sensorische Veränderungen in der H-Milch während der Lagerung.

Renner, E.; Schmidt, R.

Deutsche Milchwirtschaft 25 (4) 97-100 (1974)

[5 ref. De] [Justus-Liebig-Univ., Giessen, Federal Republic of Germany]

Organoleptic deterioration and accompanying increase in free fatty acid content were compared for directly and indirectly heated UHT milks stored at 0°, 20° and 38°C. Deterioration, very slight for both at 4°C, was greater for the indirectly than the directly heated milk at the higher temp., becoming appreciable in some 3 and 6 wk respectively at

20°C, and 1 and 3 wk respectively at 38°C.

Corresponding differing increases in free fatty acid contents also occurred but developed more slowly. Reduction in the fat content of the milk, from 3.4 to 1.7%, reduced the rate of deterioration. GTP

26

[Special number: Annual conference of the Association of Urban Dairy Factories.] Verband grossstädtischer Milchversorgungsbetriebe e.V. Germany Federal Republic of, Verband grossstädtischer Milchversorgungsbetriebe e.V. *Deutsche Milchwirtschaft* 23 (23) 827-829, 834-836, 838, 840-841, 844-846, 848, 853-858, 860-861, 864-866, 869-872, 875-878, 880-882, 885-888 (1972) [De]

This special number includes the following articles: UHT processing and its effects on milk and milk products, by F. Kiermeier (pp. 836...844, 41 ref.); Technology of UHT processing, by W. Rössler (pp. 845...848, 2 ref.); UHT milk products from the dairy Kurhessische Milchverarbeitung Kassel (pp. 851...858); USSR - the world's biggest milk producer, by J. Bucker (pp. 860...869); Problems of milk production, by B. Bauknecht (pp. 870-871); Development programme for individual farms in the Federal Republic of Germany, by D. Blaschke (pp. 872...877); and Consistency measurements on butter and processed cheese using the FIRA-NIRD extruder, by C. Bürki & E. Flückiger (pp. 878...881). FL

27

Aseptic filling process.

H. J. Heinz Co.

British Patent 1 339 283 (1973) [En]

Aseptic filling method for ketchup feeds a bottle into a steam filled chamber, sucks out the air from the bottle and replaces it with steam from the chamber, seals the bottle mouth with a gasket through which a filling tube projects, and then draws the ketchup into the bottle through the tube by condensing the steam in the bottle. IFT

28

Aseptic-packaging-machine design.

Kelsey, R. J.

Modern Packaging 47 (2) 37-40 (1974) [14 ref. En]

Problems of aseptic packaging and pre- and post-sterilization of foods in flexible and semi-rigid packs are discussed; aspects considered include the microbiology of foods, packaging materials and packaging equipment; existing aseptic packaging systems; sterilization of equipment, and sterilization of packaging materials with H₂O₂, ethanol or ethylene oxide, or by UV or electron-beam irradiation. AJDW

29

Aseptic packaging method and machine.

Pierce, J. E. (Dart Industries Inc.)

United States Patent 3 783 581 (1974) [En]

Apparatus and method for aseptic packaging of sterile foods (not specified) and other products (e.g. drugs) into sterile containers are covered by this specification. The apparatus incorporates a container sterilizing section, container filling section, cover sterilizing section and a cover sealing section, all enclosed in a chamber in which a sterile atm is maintained at a pressure above atmospheric in order to maintain the containers and covers in a sterile condition during the filling and cover sealing operation. EJM

30

Effect of ultra-high temperature steam injection on flavor acceptability of whole and fortified skim milks.

Hansen, A. P.; Turner, L. G.; Jones, V. A.

Journal of Dairy Science 57 (3) 280-284 (1974) [16 ref. En] [Dept. of Food Sci., N. Carolina St. Univ., Raleigh 27607, USA]

Whole milk (3.25% fat and 9% SNF) and low-fat fortified milk (0.9% fat and 11% SNF) were processed in a No-Bac Aro-Vac [Cherry-Burrell Corp.] equipped with an UHT direct steam injector. Milk was preheated to 71°C and then heated to 107, 121, 135 or 143°C and held for 1.5 or 5 s. Samples were also heated to 135 or 143°C and held for 10 s. Samples were stored at 1.7 or 7.2°C and analysed by a taste panel at 2, 9, 16, 23 and 30 days, both triangular and preference tests being used. After 30 days of storage at 7.2°C, whole milk and fortified low-fat milk heated at 135 and 143°C for 10 s were acceptable. Storage at 1.7°C for 30 days resulted in flavour scores between acceptable and good for all processing tem. and times. Acceptable milk can be produced by UHT direct steam injection. AS

31

[Statistical quality control in bacteriological efficiency tests of UHT plants.] Die statistische Qualitätskontrolle als Mittel zur Prüfung der bakteriologischen Wirksamkeit von UHT-Anlagen. Wasserfall, F.

Milchwissenschaft 28 (12) 758-766 (1973) [10 ref. De, en] [Inst. für Mikrobiol. der Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The principles of statistical quality control as applied in UHT plants are explained (based on bacteriological examination of a random sample from each batch of packaged UHT milk) and the risks which this method entails for the manufacturer and the consumer are discussed. In a detailed account of the calculation of a random

sampling programme it is shown that a random sample comprising 300 packages is required for quality control of a batch of 3000-8000 packages if the max. acceptable proportion of faulty packages is fixed at 0.1% (the batch being rejected if >1 package is faulty). ADL

32

The aroma of canned beef: processing and formulation aspects.

Persson, T.; Sydow, E. von

Journal of Food Science 39 (2) 406-413 (1974) [18 ref. En] [Swedish Inst. for Food Preservation Res. (SIK), Fack, S-400 21 Göteborg 16, Sweden]

Influence of processing techniques and formulations on chemical and sensory aroma properties has been studied with the purpose of finding ways to improve flavour of canned meat. HTST-sterilization, 'aseptic' canning and sterilization in various packaging materials including flexible pouches have been investigated. It was found that 'aseptic' canning and, especially, HTST-sterilization had a pronounced positive effect on aroma, in the latter case for samples packed in thin layers (flexible pouches). It was shown that addition of, e.g. fumarate or maleate in small amounts (0.06-0.15%) before sterilization decreased concn. of H₂S and mercaptans, and addition of certain amino acids, e.g. arginine, decreased the concn. of the aldehydes. Both types of ingredient resulted in an improved aroma. Storage changes have also been investigated. It was found that there was a tendency towards a more accelerated change in flexible pouches compared with rigid cans. [See FSTA (1973) 5 11S1272 for previous part.] IFT

33

[Method and equipment for heat treatment of foods.] Verfahren und Vorrichtung zur Hitzbehandlung von Lebensmitteln.

Herrmann, J.; Buhr, H.; Schneider, H.-U.; Gaul, E. *German Democratic Republic Patent* 104 022 (1973/1974) [De]

A continuous HTST system for cooking and sterilization of foods is described. The system, which is especially suitable for foods of plant origin, includes a pre-cooker, a HTST pressure cooker and various types of packaging equipment. IN

34

Two citrus advances: aseptic juice in glass; year-round packaging.

Lawler, F. K.

Food Engineering 46 (3) 97-99 (1974) [En] [Food Engineering, Box 2035, Radnor, Pennsylvania 19089, USA]

The first part of this article discusses the development of an aseptic packaging system for chilled orange juice in glass bottles by the Adams Packaging Assoc., Auburndale, Florida. The key to the system is the isolation of the bottle filler inside

a pressure-tight sterilizable stainless steel chamber which avoids product contamination. The filler is sanitized on line by water under pressure at 260°F. The steam released sanitizes the enclosure and sterilizes the filler. The packaged juice is refrigerated but this is not essential. The second part discusses the storage of conc. orange juice and its reconstituted products in large stainless steel tanks at chill temp. Storage for up to 2 yr may be feasible. Computer controls are being installed at the 800 000 gal capacity series of tanks at Citrus World, Lake Wales, Florida. The juice is packaged for shipment when needed. JA

35

[Changes in sterilized milk during storage.]

Biryukova, Z. A.; Seleznev, V. I.; Dombrovskaya, E. I.; Makarova, A. I.

Molochnaya Promyshlennost' No. 3, 28-30 (1974) [6 ref. Ru] [Vses. Nauchno-Issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Samples of UHT milk sterilized by steam injection at 140°C with 4 s holding and aseptically packaged into Tetra Pak cartons with Al inserts were obtained from the Cherkiz dairy plant. The packages were held at 20°C in a room with the exclusion of direct sunlight and were tested at 10, 30, 60 and 90 days; raw milk samples from the same plant were also analysed. UHT processing slightly decreased the TS content and density; the milk had a clean flavour with a pasteurized taste and its acidity was decreased by 0.8°T. Holding the milk for 3 months had no effect on TS and fat contents and little effect on acidity (increase from 18.2 to 20.0°T). Flavour changed little during the first 30 days of storage, but thereafter a deterioration was noted as well as formation of sediment and cream rising; at 3 months bitter and stale off-flavours were noted. Total protein and casein contents declined with storage time whilst non-protein N and soluble proteins increased. It is concluded from the results that UHT milk aseptically packaged in cartons with Al inserts may be stored at room temp. for 30 days without significant changes in organoleptic and other indices. FL

36

A conference on the mechanical engineer's contribution to process engineering in the food industry. [Conference proceedings]

United Kingdom, Institution of Mechanical Engineers; United Kingdom, Society of Chemical Industries

130pp. (1972) [many ref. En] London SW1, UK, Institution of Mechanical Engineers

Papers read at this Conference, held in Churchill College, Cambridge, on Sept. 21-22, 1972, included: The food industry and the role of the engineer, by J. Sheldon (pp. 1-8); Mechanical operations in the preparation of foods for processing, by A. E. V. Lilly (pp. 9-15, 31 ref.); Mechanical equipment used in the preparation of

raw materials and foodstuffs, by A. O. Roberts (pp. 17-25); Fish handling and processing, by G. C. Eddie & J. H. Merritt (pp. 27-32, 13 ref.); The mechanics of materials handling, by K. Cook (pp. 33-43); Mechanical engineering in cryogenic air blast and plate freezing, by D. W. Everington & J. Abbott (pp. 45-52, 6 ref.); Hygienic design of food plant, by D. T. Shore (pp. 53-62, 1 ref.); Engineering aspects of pasteurization and sterilization of foods by heat, by A. C. Brown (pp. 63-69, 9 ref.); The aseptic canning system and its role in modern food processing, by H. R. Goff (pp. 71-76); Freeze drying. The engineering research and development for a continuous process, by J. A. Howard (pp. 77-85, 4 ref.); Innovation in food engineering, by R. Jowitt & J.-J. Bimbenet (pp. 87-92, 6 ref.). HBr

37

[Aseptic packaging in cups.] Die aseptische Abfüllung in Becher.

Anon.

Deutsche Milchwirtschaft 25 (24) 822, 827, 830 (1974) [De]

This article deals with aseptic packaging of dairy products into cups on Benhil form-seal machines and Hamba aseptic fillers. Aseptic Benhil machines of the form-seal type in current use have a max. hourly capacity of 25 000 coffee cream portion packs, and are also used for packaging milk in 0.25 and 0.5 l. sizes and for whipping cream. The Hamba machines are made in several versions: an 8-row unit for coffee cream (in 7-25 g portions) in cups of 46 mm max. diam.; a 4-row unit for desserts, etc. using cups of 95 mm max. diam. and 100-250 ml capacity; and a 5-row unit for cups of 75 mm max. diam. and 100-250 ml capacity. The operation of the system is outlined, and experience at a Berne dairy during Oct. 1973-Jan. 1974 with 2 machines for aseptic packaging of coffee cream in portion packs is discussed. During this period >18 000 000 portion packs were produced. FL

38

Process is aseptic. High-speed machine fills, seals, packs half-ounce creamer portions.

Anon.

American Dairy Review 36 (5) 32B-32C (1974) [En]

A machine (Cupmaster Model 403) for aseptic packaging of coffee cream in portion packs (0.5 oz) at a rate of 600/min is described. The UHT product is fed to the machine either direct or via a sterile tank, and filled in an atmosphere of filtered air into polystyrene cups, supplied in the form of trays each with 50 individual cups in 10 × 5 rows. The filled sealed cups are packed into cartons in pre-selected quantities, or inserted into 30 unit trays for further cartoning. FL

Thermal inactivation characteristics of a sporeformer isolated from spoiled UHT cream.

Irish Journal of Agricultural Research 13 (1) 61-68 (1974) [17 ref. En] [An Foras Taluntais, Dairy Microbiol. Dept. Moorepark Res. Centre, Fermoy, Co. Cork, Irish Republic]

A sporeformer causing spoilage in UHT cream (18% fat) was classified as a sp. of *Bacillus megaterium*. D values of washed spores in cream ranged from 23.8 min at 91°C to 2.7 min at 98°C with a z value of 7.4°C. The D values in M/15 phosphate buffer (pH 7) varied from 32.4 min at 91°C to 2.7 min at 98°C with a z value of 6.4°C. The heat resistance of washed vegetative cells of the bacillus in cream (52°C) and buffer (48°C) was not excessive but could not be described by a D value. Extrapolation of the results for resistance of spores to cream UHT treatment conditions indicated that there would be no survival in the processed product [D value would be approx. 0.001 s]. AS

[Changes in the composition of yoghurt during prolonged storage in hermetically sealed vessels.]

Prodanski, P.; Girginov, T.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyslennost 16 (2) 23-33 (1969) [7 ref. Bg, ru, en]

Results are discussed of analysis of cows' milk yoghurt after storage for 2 yr (15 samples) or 4 yr (4 samples) in hermetically sealed vessels at 3-5°C or at room temp. It was found that the *Streptococcus thermophilus* and *Lactobacillus bulgaricus* cells remained active after 2 yr at either temp. and even after 4 yr at low temp. Proteins were normal after 2 yr at low temp. but not after 4 yr. Methionine, valine, phenylalanine, leucine and isoleucine, as well as the free fatty acids, 1,3- and 1,2-diglycerides and monoglycerides, were found after 2 yr at room temp. but decreased sharply or disappeared altogether after 4 yr. Lactose was found in varying concn. after 2 or 4 yr at either temp. ADL

Abstracts of papers to be presented at the Sixty-Ninth Annual Meeting. Manufacturing section.

Chemistry.

United States of America, American Dairy Science Association

Journal of Dairy Science 57 (5) 599-602 (1974)

[En]

[Continued from preceding abstr.] Electron-microscopic detection of sulfur in milk gels, by M. Kalab (M94); Reactivation of alkaline phosphatase in liquid milk products heated to ultra-high, short time temperature, by G. K. Murthy, S. Cox & L. Kaylor (M95); Determination of small quantities of choline reineckate, by C. J. Argoudelis & J. Tobias

(M96); and Interaction of lactose and casein caused by ultra-high temperature steam injection processing, by L. G. Turner, A. P. Hansen & H. E. Swaisgood (M97). CDP

[UHT sterilizer 'Stematic Longrun'.]

Corradini, C.; Bottazzi, V.

Technicien du Lait Mar. 49-51 (1974) [Fr]
[Dipartimento per Ricerche Pattiero-Casearie, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

'Stematic Long Run' UHT sterilizer (very briefly described and schematically illustrated) has a capacity of 16 000 l. milk/h. It is claimed to operate for 40 h at constant flow rate and without appreciable temp. changes in the steam injector and deodorizer. The plant has been in operation since Feb. 1973. FL

Aseptic packaging.

Berry, J. (E. P. Remy et Cie)

United States Patent 3 809 768 (1974) [En]

Containers are introduced, while being sterilized externally, into a packing enclosure which has previously been sterilized. The containers are filled with previously sterilized products and sealed with sterilized closures, the entire process being conducted without destroying the sterility of the apparatus. IFT

[Use of physical sterilization methods in the manufacture of aseptic packs.] Einsatz physikalischer Sterilisationsverfahren bei der Herstellung aseptischer Packungen.

Sturm, W.; Gilliland, A.

Verpackungs-Rundschau 25 (4) 298-302. (1974)
[6 ref. De, en, fr] [Aluminiumwerk AG., Rorschach, Switzerland]

Details are given of studies on surface sterilization of plastics, lacquered or unlacquered Al foil, or Al foil/plastics film laminates by means of electron or UV irradiation. Studies with a 150 keV 1 kw electron-irradiation unit showed that plastics and Al foil containers artificially contaminated with *Bacillus subtilis*, *B. stearothermophilus*, *B. coagulans*, *B. globigii*, *Clostridium sporogenes*, *Penicillium chrysogenum* and *Aspergillus niger* suspensions ($\leq 1.2 \times 10^8$ bacteria/ml) were sterilized by irradiation for 0.5-1.5 s. Studies on the effects of electron irradiation on plastics showed that PVC was unsuitable for irradiation; polyamides and polyesters were unaffected by a single irradiation but were adversely affected by ≥ 5 irradiations; and radiation resistant lacquers and polypropylene were unaffected. Studies with a 1-2 kw UV irradiation

unit showed that counts of *Escherichia coli* were reduced by a factor of 10^8 by irradiation for 2-3 s. *Bacillus* spp. required irradiation for 5 s to reduce their count by 10^7 ; and *Mucor mucedo*, *Aspergillus niger* and *Penicillium chrysogenum* required irradiation for 30-60 s to reduce their counts by a factor of 10^6 - 10^7 . Advantages and disadvantages of irradiation sterilization of packaging materials are discussed, with special reference to aseptic packaging. AJDW

45

Pro-milk - a report on a Swedish development aid project.
Anon.

Dairy Industries 39 (7) 252-254 (1974) [En]

The article deals with technological aspects of Pro-milk manufacture and evaluation of the suitability of the product in developing countries and outlines future plans. Pro-milk is a concentrated milk product with 38-45% TS including 2-3% animal fat and 1% cocoa flavour. It is made by concentrating under vacuum milk with about 0.5% fat and adding the flavouring to improve acceptance of the product; the fat may be of vegetable or animal origin, its content may be varied and vitamins, Fe, etc. may be added. The product is UHT sterilized and aseptically packaged in 20-24 g portions in Tetra Pak containers. It is consumed direct without dilution from the packs after removal of a pull-tab to expose a hole. A consignment of 5 t Pro-milk sent by air (+ an unspecified quantity by sea) from Sweden to the Republic of Niger for famine relief withstood well the transport and distribution hazards, and a very satisfactory acceptance is reported. FL

46

[A major development: the Stematic Long Run UHT sterilizer.]

Bottazzi, V.; Bonomi, E.; Corradini, C.
Mondo del Latte 28 (3) 169-171 (1974) [It]
[Dipartimento Ricerche Lattiero-casearie, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

The authors discuss experience with this direct steam injection sterilizer, in operation in Italian dairy industry since Feb. 1973, and describe some of its main features. ADL

47

[New aseptic system for UHT milk in plastics bottles.] Neues Aseptik-System für H-Milch in Kunststoff-Flaschen.
Titelbild, Z.

Deutsche Milchwirtschaft 25 (27) 934, 936-940 (1974) [De] [Rommelag Maschinen GmbH & Co., Kurhessische Milchverwertungs GmbH KG, Kassel, Federal Republic of Germany]

A brief description is given of the use of the 'bottle-pack-system' in a dairy in Kassel for aseptic

packing of UHT milk. The packaging plant produces plastics bottles, fills them with milk and seals them in one operation. The product range comprises 3 types of milk with 3.5, 1.5 and 0.3% fat respectively. The output at present is about 30 000 units/day; a storage life of 6 wk is guaranteed. FL

48

Symposium on newer food processing technology.
[Book]

Breeling, J. L.; Nagy, M. (Editors)
vii+269pp. (1973) [84 ref. En] Chicago, Illinois, USA; American Med. Assoc. Price \$3.00

The following papers were presented at a Symposium on Newer food processing technology, sponsored by the AMA Food Industry Liaison Committee and the Food Science Committee, Council on Food & Nutrition, American Medical Association, held at Pheasant Run, St. Charles, Illinois on 14-16 Aug., 1972: Public responsibilities on new products and processes, by V. O. Wodicka (pp. 2-11); The philosophy of acceptable risk, by W. J. Darby (pp. 12-21); A critical appraisal of aseptic canning, by K. Ito (pp. 24-34); Aseptic canning of low-acid foods in rigid metal containers, by W. Segner (pp. 35-50); High-temperature/short-time sterilization, by J. P. Bolanowski (pp. 51-62); Frozen food quality - time/temperature, by C. Byrne (pp. 65-72); Facts and fancies about sanitation and microorganism survival during dehydration, by E. Seltzer (pp. 73-82); Sanitation in newer drying techniques including thermo and bed drying, by R. L. Maurer (pp. 83-93); Continuous retorting, by J. Holme (pp. 94-105); Criteria for obtaining and maintaining biological stability in pre-processed foods, by W. Barakat (pp. 109-114); Commercial pre-processing of tomato products, by P. E. Nelson (pp. 115-125); Pre-processing of dairy products, by K. Weckel (pp. 126-134). VJG

49

- [Actinisation, a new technique for wine preservation.]

Anon.

Revue de l'Embouteillage et des Industries du Conditionnement No. 138, 22-23 (1974) [Fr]

The effects of IR irradiation (actinisation) on the gastronomic properties and keeping quality of wines are compared with those of heat pasteurized wines. Actinisation provides a simple method for stabilizing wines without the addition of SO_2 and without altering the taste or colour. It also allows the wine to be bottled aseptically. MEG

50

Apparatus for the sterile packing of food products and foodstuffs.

Müller, H. A. (Hamba Maschinenfabrik (Hans A. Müller))

British Patent 1974 (1974) [1 354 872 En]

A machine for aseptic packaging of food products, e.g. milk products in cups, is described in which rows of containers are passed by an endless conveyor through a large sterile chamber in which they are sterilized by spraying with a sterilant, dried, filled with the product, provided with lids and sealed. Finally, the filled containers are removed from the conveyor and the chamber by a vertical ejector and transported away by another conveyor. Provision is made for cleaning and sterilizing the chamber with a sterile liquid and drying it subsequently with sterile air. FL

51**A method and machine for producing sterile packages.**

Reinecke, G.; Linke, D. (Benz & Hilgers GmbH)
British Patent 1 357 304 (1974) [En]

The machine for aseptic packaging of UHT liquid or semi-liquid products employs the following steps: drawing a web of plastics film from a supply roller, guiding it through a sterilization bath, and then feeding it successively to heating, forming, filling, closing and cutting stations. A common sterile tunnel in which excess pressure of sterile gas is maintained extends over several of these stations to maintain sterile conditions. FL

5 2**[A new distribution system for Tetrabrik aseptic cartons.] Neues Distributionssystem für Tetrabrik Aseptik.**

Anon.

Molkerei-Zeitung Welt der Milch 28 (30) 821-822 (1974) [De]

A brief illustrated description is given of a new multi-pack of corrugated cardboard for twelve 1-l. Tetrabrik cartons of milk, arranged in 4 rows each of 3 packages. The multi-packs have transverse perforations which enable easy separation of units consisting of 3, 6 or 9 packages. The multi-packs are supplied as flat blanks and are assembled and loaded in a cartoning machine with a max. capacity of 4000 units/h. FL

53**[Cultured milk products.] Sauermilchprodukte. [Book]**

Puhan, Z. (Switzerland, Schweizerischer Verband der Ingenieur-Agronomen und der Lebensmittelingenieur)
100pp. (1973) [many ref. De] Zürich, Switzerland; Eidgenössische Technische Hochschule. Price DM 20.--

These papers, which were presented and discussed at a course organized by the Swiss Association of Agronomic and Food Engineers at the Technical High School, Zürich, in Nov. 1972, have also been published in Schweizerische

Milchzeitung (1973) 99. They comprise: Critical consideration of present yoghurt production with regard to protein modification, by M. Groux (pp. 9-15, 10 ref., FSTA (1973) 5 12P1794); Progress in quarg manufacture, by M. Keller (pp. 17-21, 7 ref., see FSTA (1973) 5 5P684); Some foreign cultured milk products, by Z. Puhan (pp. 23-29, 10 ref., see FSTA (1973) 5 5P706); Preparation of fruit and spice additives for cultured milk products, by H. P. Müller (pp. 31-36, 2 ref., see FSTA (1973) 5 5P621); Aseptic manufacture and packaging, by M. Frölich (pp. 37-41, see FSTA (1973) 5 9F369); Heat treatment of finished products, by E. Siegenthaler (pp. 43-51, 4 ref., see FSTA (1973) 5 6P819); Bacteriological aspects of keeping quality prolongation, by H. Glättli (pp. 53-57, 7 ref.); Value of cultured milk products in modern nutrition, by B. Blanc (pp. 59-71, 40 ref., see FSTA (1974) 6 5P707); Importance of cultured milk products in developing countries, by M. R. Bachmann (pp. 73-82, 33 ref.); The role of cultured milk products in convalescence, by F. Wasserfall (pp. 83-88, 15 ref., see FSTA (1973) 5 8P1080).

CDP

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H. BROOKES

ASSISTANT EDITOR

1

[Milk desserts separately packaged.] Milchdesserts sortiert abgepackt.

Anon.

Molkerei-Zeitung Welt der Milch 28 (36) 990-992 (1974) [De]

A brief illustrated description is given of the Dogatherm 41S machine for packaging liquid or pasty products, such as plain yoghurt, fruit yoghurt, quarg, cream, desserts, puddings and fruit juices into pre-formed plastics, Al or paper cups. A feature of this machine (max. capacity 8000 containers/h) is that it enables several different products, e.g. 4, to be filled and sealed in packages with differently overprinted lids at the same time. Lids may be of flat Al or skirted Al foil (both heat-sealed) or of plastics material applied by pressure. The machine may also be designed for work under aseptic conditions. FL

2

Express Dairy's aseptic portion pack operation for catering trade.

Anon.

Milk Industry 75 (3) 30-31 (1974) [En]

The use since May 1973 of an ITW 403 Conex Cupmaster at the Express Dairy plant, Crediton, UK for packaging milk and cream in 0.5 oz cups under aseptic conditions is described. The throughput is 550 cups of milk or 520 cups of cream or half cream/min; the pre-formed cups are of polystyrene and the lids of Al foil, but it is planned to change to a stronger paper Mylar material. It is stated that the failure rate is <1 cup /10 000. FL

3

Mothers' milk substitute in aseptic package opens new markets for dairy.

Gillies, D. J.

Modern Dairy 53 (7/8) 12, 14 (1974) [En]

UHT baby milk 'Tutteli', aseptically packaged in 0.20-1. Tetra Brik cartons, was developed in Finland over 1 yr ago. The product, which contains (per 100 g) 2.5 g protein, 8 g lactose, 3.5 g butterfat, 0.4 g mineral salts, vitamins etc. (skim-milk, lactose, butterfat, vegetable oil and dried milk are major ingredients), is made by a process involving UHT sterilization at 275°F with 3 s holding and instant cooling to 35-40°F. Storage life is ≥3 months without refrigeration. FL

4

Where (and when) is aseptic going?

O'Keefe, J.

Food in Canada 34 (9) 31-32 (1974) [En]

The development of aseptic food packaging is outlined, and its advantages and disadvantages are briefly discussed. AA

5

Non-thermal aseptic methods.

Anon.

Food in Canada 34 (9) 37-38 (1974) [En]

Various non-thermal sterilization techniques developed for food packaging materials other than metals are discussed. The non-thermal systems are based on the action of chemicals on micro-organisms. Sterilization of the food product is accomplished by HTST methods in continuous heat exchangers. In the packaging environment the incoming air is filtered to reduce the microbial count; some systems employ both filtration and incineration of the air to effect sterility. AA

6

Aseptic - the major problems

Anon.

Food in Canada 34 (9) 33-34 (1974) [En]

Problems encountered in aseptic packaging are discussed with special reference to the sterilization of plastics and paper-plastics thermoform fill and seal systems; deposit fill and seal systems; blow mould, fill and seal systems; and flexible package form, fill and seal systems, where excessive heating cannot be used because of packaging material damage. Various alternatives to direct heating are discussed, including ionizing radiation, high energy electrons (which have proved too expensive so far), UV (which cannot penetrate into shadow areas) and various chemical sterilization techniques. AA

7

Thermal aseptic techniques.

Anon.

Food in Canada 34 (9) 36 (1974) [En]

Thermal aseptic techniques employed for food packaging are briefly discussed, including reference to the Dole, Cherry-Burrell, Fran-Rica, and Hambart drum systems. AA

8

[Problems of the dairy industry in Bosnia and Hercegovina in the realisation of the programme for expansion of the activities of the UPI organization.]

Parijez, S.

Mljekarstvo 24 (6) 140-143 (1974) [Sn] [UPI - Ind. Mlijeka i Sladoleda, Sarajevo, Yugoslavia]

The UPI dairy plant in Sarajevo processes daily about 100 000 l. milk, mainly into pasteurized and UHT milk, cultured products and ice cream. Two UHT production lines are used in combination with aseptic packaging into Tetra Pak containers. UHT milk has a very good acceptance by consumers and will be useful for regulating the liquid milk market particularly during the summer when the consumption of pasteurized milk markedly

fluctuates. Some problems of milk production and work for improving milk treatment on the farm and milk collection are outlined. FL

9

The nature of casein aggregates in heated and stored milk.

Cheeseman, G. C.; Knight, D.

Journal of Dairy Research 41 (3) 359-366 (1974) [17 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, RG2 9AT, UK]

Gel filtration on Sepharose 6-B was used to study the size distribution of sub-micellar casein aggregates in colloidal phosphate-free milk, and comparisons were made between the elution profiles obtained for fresh, heated, UHT-treated and stored UHT milks. Increase in length of storage of UHT milk gave rise to an increase in proportion of casein aggregates excluded from Sepharose 6-B, but no corresponding increase in size of included casein aggregates was observed. AS

10

Milk Marketing Board Development Department at Crudgington.

Anon.

Dairy Industries 39 (8) 291-293 (1974) [En]

The unit, designed for development work on products from milk, was officially opened on 6 June 1974. It has 4 teams working respectively on UHT and aseptically packaged products, spray-dried products, cheese, and products from ultrafiltration; an additional team, based on Thames-Ditton, works on the development of new milk products (desserts, creams, yoghurts etc.). Equipment includes an APV ultra-high temp. sterilization plant with a capacity of 50-100 gal/h (which may be linked to a 200 gal aseptic road tanker for despatch of products to other plants for trial runs on aseptic packaging), a NIRO stainless steel spray-drier with 35 kg evaporated water/h capacity, and a 1000 gal/h Babcock & Wilcox ultrafiltration plant. FL

11

[Remarks on application of Yugoslav regulations on quality of milk and milk products as well as on other regulations concerning quality.]

Jovic, D.

Hrana i Ishrana 15 (3/4) 159-164 (1974) [Sh, en] [Savezni Trzisni Inspektorat, Belgrade, Yugoslavia]

Problems of quality of market milk, pasteurized milk, UHT milk, cultured milk, yoghurt, kefir, chocolate milk, sweetened condensed and evaporated milk, dried milk, sweet and cultured cream, butter, and cheese are discussed in the light of the Yugoslav regulations on quality of milk, milk products, rennet, dairy cultures, ice cream, ice cream mix, eggs and egg products ['Sluzbeni list SFRJ', br. 15/64, 36/64, 44/70 and 33/72]. SKK

12

Packaging applications and trends.

Anon.

Food Manufacture 49 (9) 45, 49-50, 52, 54, 58, 62 (1974) [En]

Case histories of successful material and machine applications and the outlook for some packaging developments are discussed in this survey. These include oriented polypropylene (OPP), high barrier cellulose films, 3-dimensional flexible packaging, new Cryovac range of multi-ply barrier materials, foil printing for shrink-wraps, pillow pack for apples, aseptic packaging of liquids, aseptic portion packaging system, prelined food cartons, and carton closure tapes. JA

13

Un-Drum container cuts aseptic packaging costs.

Anon.

Food Production/Management 97 (3) 17 (1974) [En]

Details are given of the 'Un-Drum', a 60 gal aseptic Bag-in-Box food container system developed by Scholle Corp. It consists of a heavy duty, 3-ply corrugated box with a heavy plastic liner bag. The container can be used for aseptic or non-aseptic liquids and pastes. The Un-Drum weighs only 18½ lb, providing savings in shipping and handling, and when empty it takes 88% less space than rigid drums because it packs flat. AA

14

[German Agricultural Society's testing of liquid milk in 1974.] DLG-Trinkmilchprüfung 1974.

Kynast, S.

Molkerei-Zeitung Welt der Milch 28 (41) 1139-1140 (1974) [De]

A total of 432 samples of market milk, including 22 'Vorzugsmilch', 337 pasteurized, 21 low-fat (4 protein-enriched), and 52 UHT (4 protein-enriched) were tested in Nürnberg, 21 June 1974. The results, including flavour defects, are presented briefly showing that 51% of all the samples were given the highest award, 20% silver medal and 5% bronze medal. FJ

15

[Method for production of condensed sterilized milk.]

Radaeva, I. A. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)

USSR Patent 439 266 (1974) [Ru]

Milk is standardized to a fat to SNF ratio of ≥ 0.35 , pasteurized, condensed, homogenized and cooled. Stabilising salts are added, and the product is packaged and sterilized. W&Co

16

[Protection of food from microbial contamination. II.] [Review]

Yoshii, H.

Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 21 (6) 293-302 (1974) [63 ref. Ja] [Food Res. Inst., Aichi Prefecture, Nishi-ku, Nagoya, Japan]

Topics discussed include heat sterilization, low-temp. storage and transport of food, washing and sterilization with chemicals, sterilization of air, filtration sterilization of liquid food, and methods of assay. SKa

17

[Market analysis of packaging of pasteurized and UHT milk in the German Federal Republic in 1973.] Marktanalyse der verschiedenen

Verpackungsarten von pasteurisierter und ultrahocherhitzter Trinkmilch in der BRD 1973. Longuet, D.

Deutsche Molkerei-Zeitung 95 (36) 1278, 1280-1282 (1974) [De]

The situation in the packaging of liquid milk in the German Federal Republic in 1973 was studied by means of questionnaires involving 74 dairy plants responsible for about 70% of the total liquid milk output. The results, showing the shares of the different packaging systems and package sizes in the total volume of packaged milk, are tabulated for the whole of the Republic as well as for 4 different areas, in comparison to 4 preceding years. Major trends during 1969-1973 included a great reduction in the use of glass bottles and increases in plastics sachets and bottles and in cartons; in the same period the share of loose milk in total vol. of liquid milk fell from 35.9% to 23.9%. Sales of UHT milk increased rapidly during the 5 years (from 66.9 to 397 700 t) and in 1973 they accounted for about 16% of the total liquid milk market. With an 80.4% share of the UHT market Tetra Brik containers predominated, followed by Tetra Standard (8.5%), Pure Pak (7.7%), and Zupak and Selfpak (3.4%). One-l. carton was the major package size, followed by 0.5 l.; the 0.25 and 0.20 l. sizes are of little importance in UHT milk packaging. FL

18

[Developments in methyl packs for foods.]

Glerum, J. A.

Voedingsmiddelentechnologie 7 (44) 36-37 (1974) [Nl]

Aspects considered in this discussion of rigid metal containers for foods (presented at the symposium 'Packaging of foods' held in Utrecht, 27 Nov. 1973) include: packaging materials (tinplate, non-tinned steel, chromium/chromium oxide coated steel, Al); seaming methods (soldering, welding, glueing); lacquering; 2-piece deep drawn cans; the required strength characteristics of cans (with

reference to pressure changes during sterilization, and the use of cans for packaging of carbonated beverages); interaction of the can and the can contents; easy-open systems; aseptic canning; and flame sterilization of canned foods. AJDW

19

Commercial sterilization and aseptic packaging of milk products.

Aggarwal, M. L.

Journal of Milk and Food Technology 37 (5) 250-254 (1974) [1 ref. En] [Yogurt Master Inc., Lakeland, Florida, 33802, USA]

A useful summary of UHT sterilization and aseptic filling problems is given. Most of the information is familiar, especially in Europe, but there is material on the aseptic Pure-Pak in practice and on the place of aseptically filled UHT products in the US market. HBu

20

First UHT milk plant in South Africa.

Downes, T. E. H.

South African Journal of Dairy Technology 6 (3) 187 (1974) [En]

The plant, commissioned by a Queenstown creamery in July 1974, is an APV Uperiser which works in conjunction with a Tetra Pak aseptic packaging machine using Brik cartons. The milk is heated indirectly by steam to 80°C in tubular heaters and then by direct steam to 150°C, held at that temp. for 2.5 s and cooled by evaporation. CDP

21

Degradation and slip in rotary positive displacement helical gear pumps.

Higgs, S. J.

Process Biochemistry 9 (10) 27-28 (1974) [1 ref. En] [Nat. Coll. of Food Tech., Univ. of Reading, UK]

Transport of food liquids of high viscosity or containing solid particles is discussed, with particular reference to continuous sterilization and aseptic packaging e.g. milk, eggs, fruit juices, purees. Centrifugal pumps are usually unsuitable and positive displacement pumps are generally used. In the latter case shearing of the material during passage through the pump and a falling flow rate with rising viscosity may be important factors with food materials. Experimental data are presented for a Molex G 120 rotary positive helical gear pump during passage of an emulsion through the pump, showing shear stress vs. time for the emulsion before and after passing through the pump, and % slip and fall in flow rate at different viscosities and discharge side pressures. Some breakdown of material by shearing was demonstrated; a slight degree of slip occurred but was very small, even at low viscosities, under normal conditions of operation in the food industry. ELC

22

Acid-steam sterilization.

Stewart, A. P., Jr.

United States Patent 3 839 843 (1974) [En]

A method is described for aseptic canning of sterile products in containers which have been pre-heated to a temp. of 225-240°F and then sterilized by exposure to an acid-steam mixture at a temp. of 240-300°F. IFT

23

[Aseptic packaging of UHT milk.]

Anon.

Revue Laitiere Francaise No. 324, 733, 735 (1974) [Fr]

A brief illustrated description is given of the first Remy installation for commercial production of UHT milk, at Saint-Hubert dairy, Nancy. The installation comprises 2 blow-extrusion plants each producing hourly 2500 closed internally sterile bottles and a Remy 7712 aseptic packaging machine with a capacity of 5000 bottles/h. The filled bottles made from special yellow plastics material are assembled in batches of 3 l. or in cartons of 12 l. FL

24

Proposal for describing the performances of aseptic packaging machines. [Conference proceedings]

Cerf, O.; Hermier, J.

XIX International Dairy Congress 1E, 802-803 (1974) [2 ref. En] [Lab. de Biochimie Microbienne, Inst. Nat. de la Recherche Agronomique, Jouy-en-Josas, France]

Results obtained previously [FSTA (1974) 6 2P135, 5P728] were used to study alternative methods of classifying defects in packaged milk products due to contamination by microorganisms. It is suggested that defects are classified either according to type (i.e. due to machine vs. faults in aseptic operations) or to time of detection (i.e. immediately vs. during storage). The use and importance of this classified information are discussed. MC

25

Methods of evaluation of aseptic form-fill-seal packaging systems. [Conference proceedings]

Dicker, R. A.; Wiles, R.

XIX International Dairy Congress 1E, 799-800 (1974) [En] [Milk Marketing Board, Thames Ditton, Surrey, UK]

Techniques are described which enable large numbers (10 000) of containers used in aseptic packaging of UHT dairy products, to be examined microbiologically on a statistical basis. MC

26

Chemical reagents for the sterilization of surfaces in aseptic packaging machines. [Conference proceedings]

Cerf, O.; Berry, J.-L.

XIX International Dairy Congress 1E, 805-806 (1974) [5 ref. En] [Lab. de Biochimie Microbienne, Inst. Nat. de la Recherche Agronomique, Jouy-en-Josas, France]

The efficiency of 3 sterilizing agents, i.e. a mixture of water and polyalcohol (use as a liquid, or vapour at >100°C and atmospheric pressure), sodium hypochlorite, and hydrogen peroxide was studied, using spores of *Bacillus stearothermophilus* NCA 1518 and *B. subtilis* var. *niger* NCDO 738, etc. The results obtained under conditions similar to those of industrial operations are discussed. FL

27

The Remy/Petroplastic procedure for aseptic packaging of milk in plastic bottles. [Conference proceedings]

Berry, J. L.

XIX International Dairy Congress 1E, 801-802 (1974) [2 ref. En] [Societe E. P. Remy et Cie., Dreux, France]

The process involves making blow-moulded containers from polyethylene, sealing them under conditions ensuring their internal sterility and transferring them to a sterile chamber, where they are automatically opened, filled, and sealed with Al/polyethylene caps. The passage to and exit of the containers from the chamber is through a sterilizing liquid. The equipment is sterilized with a mixture based on polyalcohols. In tests with an experimental installation of 500 l./h capacity, 0.008% of the 50 214 containers with defect-free closures were found to be non-sterile. FL

28

Changes in the glyceride and fatty acid contents of milkfat during sterilization and storage of the milk. [Conference proceedings]

Sokolova, T. V.; Seleznev, V. I.; Yusupova, I. U.; Belova, S. M.

XIX International Dairy Congress 1E, 213-214 (1974) [En] [All-Union Res. Inst. of the Dairy Ind., USSR]

UHT-sterilization of whole milk doubled the content of diglycerides, which was doubled again during storage for 90 days. Marked losses of unsaturated fatty acids, including linoleic acid, occurred during both sterilization and storage. JMD

29

Ultra pasteurization tested at Maryland U. Selitzer, R.

Dairy and Ice Cream Field 157 (10) 70-73 (1974) [En]

A brief description is included of the DaSi UHT sterilizer, in which milk (pre-heated to 150°F) enters special horizontal distributors that convert it into laminar free-falling films 0.02 in thick. The product passes through an atmosphere of culinary steam at about 300°F which is injected at 65 lb/in² (gauge); the heat treatment (sterilization or pasteurization) takes <0.5 s, i.e. the time which the product takes to fall freely through the sterilizer (less than 3 ft in height). Exit is through a teflon-coated conical base, the product being then cooled rapidly by flashing in a vacuum chamber. The sterilizer is to be tested at the University of Maryland. FL

30

[The 'Frau Sterile System long time' UHT plant.] Die UHT-Anlage 'Frau Sterile System Long Time'. Anon.

Deutsche Milchwirtschaft 26 (3) 58-59 (1975) [De]

The processing in this UHT plant involves regenerative pre-heating of milk to 70°C, degassing, homogenization, further regenerative heating to 120°C, indirect heating by steam to a final temp. of e.g. 140°C, and cooling to 30°C, optionally to a lower temp. The regenerative effect is said to be 81.5% and continuous processing times up to 20 h. The plant is claimed to be suitable for the sterilization of all liquid foods in particular cream, concentrated and flavoured milks, desserts, and ice cream and pudding mixes. FL

31

UHT milk from 'Stematic Long Run' new plant.

[Conference proceedings]

Corradini, C.; Bottazzi, V.

XIX International Dairy Congress 1E, 598-599 (1974) [2 ref. En] [Catholic Univ., Piacenza, Italy]

Preliminary data on protein N distribution in milk processed in the Stematic Long Run direct UHT plant are tabulated, in comparison to raw milk and HTST pasteurized milk. FL

32

[Influence of UHT-sterilization on denaturation of whey proteins.] Einfluss der UHT-Erhitzung auf die Denaturierung der Molkenproteine.

Lechner, E.

Zeitschrift für Lebensmittel-Untersuchung und -Forschung 156 (5) 279-283 (1974) [7 ref. De, en] [Südd. Versuchs- u. Forschungsanstalt für Milchwirtschaft, D-8050 Freising-Weihenstephan, Federal Republic of Germany]

The undenatured whey protein content of UHT-sterilized milk from 20 dairies employing 6 different types of plant was determined by a modified Aschaffenburg turbidity test employing heating at 100°C for 20 min. Lowest values were found where the UHT treatment was indirect,

highest where direct without degassing and intermediate where direct combined with degassing. Undenatured whey protein content correlated well with the product of heating time and temp. in excess of 70°C. GTP

33

Changes in the physical and organoleptic properties of aseptically canned UHT 10% cream during storage. [Conference proceedings]

Cheng, W. S.; Luyt, L. J.; Gelda, C. S.

8a, 82-84 (1974) [En] [Ind. Lab. of Canada, Tillsonburg, Ontario, Canada]

Samples of aseptically canned UHT processed 10% cream were stored at $22.8 \pm 1^\circ\text{C}$ and $32.2 \pm 1^\circ\text{C}$ for 12 months. Monthly physical and organoleptic tests showed that it had a shelf life of 8 months as coffee cream and 12 months as cereal cream. RM

34

Commercial sterilization and aseptic packaging of milk products.

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35

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36

[A short survey of packaging equipment and packaging materials for UHT milk, and a comparison of the manufacturing costs for pasteurized milk and for UHT milk.]

Bene, L.

Meieriposten 63 (43/44) 832-843; (45/46) 869-877; (47/48) 909-911 (1974) [14 ref. No, en]

The author briefly describes indirect (plate-type) and direct (steam-into-milk and milk-into-steam) UHT processing systems, aseptic packaging types and packaging machines, and the properties of UHT milk. He then compares the costs of (i) UHT (ii)

pasteurized milk, based on an annual output of 10 million 1-l. units. Costs (per unit), with Tetra Brik and Pure Pak cartons respectively, were: packaging materials, (i) 19.98-27.48, (ii) 14.04-15.70; equipment, (i) 2.88-3.84, (ii) 1.25-1.88; labour, (i) 1.74-1.91, (ii) 1.15-0.97, energy, (i) 2.08-2.41, (ii) 0.35-0.38; total, (i) 26.68-35.64, (ii) 16.79-18.93. ADL

37

Method and apparatus for sterilizing the outside of the filling pipe in an aseptic packaging machine.
Alpura-Koreco AG

British Patent 1 375 472 (1974) [En]

The outer surface of the product filling pipe projecting in a downward direction into the tube of packaging material is sterilized by application (e.g. spraying) of a sterilizing liquid (preferably H_2O_2) which is then collected in an annular dish and vaporized by heating, preferably by super-heated steam at 120-140°C or hot air. A simple and reliable preliminary sterilization is claimed to be achieved. FL

38

[Aseptic processing and packaging of food products.] [Lecture]

Zietarski, S. M.; Quintana, M. A.

Alimentaria 10 (48) 103-105, 107-112 (1973)

[Es] [Inst. de Productos Lacteos y Derivados Grasos, Madrid, Spain]

Aseptic food processing and packaging is reviewed under the following headings: definition, general aspects, and methods of sterilization. Flow diagrams of various aseptic processing lines are included. RM

39

[Tetra Pak's proposal for a complete storage and distribution system.]

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 20 (10) 406-412 (1974) [Da, De, En]

Differing requirements for storing different milk products (pasteurized milk, UHT products), the possibility of computerizing product stores, and economic aspects are discussed and information given briefly on 2 versions of the Tetra Pak UHT milk storage system, one using fork-lift trucks and the other special mobile stacking machinery in a highly mechanized and perhaps computerized shelf store. FL

40

Properties of aseptically packed ultra-high-temperature milk. III. Formation of polymerized protein during storage at various temperatures.
Andrews, A. T.

Journal of Dairy Research 42 (1) 89-99 (1975)

[18 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, RG2 9AT, UK]

The extent of polymer formation in UHT-sterilized milk was examined by gel filtration and it was found to depend on both storage time and temp. After some months of storage at 30° and 37°C, the extent of polymerization of the caseins and whey proteins due to reactions of the Maillard type was several times greater than the heat-induced changes resulting from the UHT processing itself. After storage for 6 months the following proportions of milk proteins existed in the form of covalently bound polymers: 50% at 37°C, 40% at 30°C, 26% at 20°C and 21% at 4°C. In addition, further amounts of polymer were formed by disulphide bonding, the contribution of such polymers diminishing gradually in a temp.-dependent manner during storage due to continuing polymerization. α_{s1} -Casein may be preferentially involved in these polymerizations with β -casein reacting at a somewhat slower rate. Polymerization and associated reactions modifying molecular charge led to expected alterations in electrophoretic mobility and a loss of definition in the electrophoretic bands. Proteolysis seemed to be of minor significance. [See FSTA (1972) 4 12P1879 for part II.] AS

41

New developments in the manufacture of UHT-milk, desserts and yoghurt in Europe.

Lück, H.

South African Journal of Dairy Technology 6 (4) 233-237 (1974) [En, af] [Animal and Dairy Sci. Res. Inst., Irene, Transvaal, South Africa]

The development of the market for UHT-treated milk, desserts and pasteurized yoghurt is discussed briefly. The increase in consumption of UHT milk overseas is given as an indication of the possible path of development the South African market for this product could take. The need for new regulations and definitions of sterilized milk or products is also suggested. The various types of desserts and basic formulae are described, together with suggestions as to how the South African industry could expand in the manufacture of these products. Pasteurization of yoghurt as the answer to achieving a longer shelf-life under local conditions is also outlined. CDP

42

[Changes in composition and properties of milk in different methods of ultra-high temperature treatment.]

Rossikhina, G. A.; Mastakov, N. N.; Kishko, Ya. G.; Andrusenko, I. T.

Trudy, Ukrainskii Nauchno-Issledovatel'skii Institut Myasnoi i Molochnoi Promyshlennosti No. 2, 1, 150-162 (1972) [25 ref. Ru] [Ukrainskii Nauchno-Issled. Inst. Myasnoi i Molochnoi Promyshlennosti, USSR]

Alfa-Laval VTIS UHT installations coupled with Tetra Pak aseptic packaging have been established

in the Moscow, Leningrad, Minsk and Donetsk municipal dairies. Milk Industry Research Institute on the effects of direct and indirect UHT treatment on milk using a small-scale laboratory installation working at regimes corresponding respectively to those of the VTIS and Stork commercial plants, direct or indirect heating being at 125°, 135° or 145°C. Results on changes in whey proteins, casein and minerals are presented and discussed in detail. It is concluded that the effects of the direct method were less marked than those of the indirect method. Packaged milk produced commercially in the VTIS installation (140°C for 4 s) kept for 30 days at room temp. without organoleptic or composition changes. SKK

43

Commercially sterile cold filling of citrus juices in glass containers.

Scott, H. C.

Food Production/Management 97 (6) 8, 10, 12 (1974) [En]

The efficiency of the commercial sterile cold fill process is discussed with reference to: juice processing; microbiological testing; bottle sterilizing; soaker-washer units; sterilizing rinsers; sterile filling rooms; air conditioning; remote operation of filling room; sterile filling; capping operations; sterilizing procedures; additional packaging line considerations; and storage. AA

44

[Method and device for the heat treatment of food products.] Verfahren und Vorrichtung zur Hitzebehandlung von Lebensmitteln.

Hermann, J.; Buhr, H.; Schneider, H.-U.; Gaul, E. (VEB Kombinat Ascobloc)

German Federal Republic Patent Application 2 410 283 (1974) [De]

Food products and particularly products of vegetable origin (e.g. potato cubes, green peas, small meat balls) are cooked and sterilized by an STHT treatment. The product is subjected to (i) a pre-heating phase and (ii) a pressure heating phase, without intermediate cooling with the treatment temp. and times varying between 70 and 100°C and 1 and 10 min for (i) and between 110 and 170°C and 1 and 10 min for (ii), according to the product, such that the desired degree of cooking and reduction of microbial activity is obtained. The heating medium may be water (with pH and salt content adjusted) or steam for the pre-heating phase and water or an infusion for the pressure-heating phase. Packaging is carried out under low-microorganism or sterile conditions, depending on the required storage time. Large packages are preferably rapidly water cooled. W&Co

45

Isolation and identification of psychrotrophic sporeformers in milk.

Grosskopf, J. C.; Harper, W. J.

Milchwissenschaft 29 (8) 467-470 (1974) [13 ref.

En, de, fr] [Dept. of Food Sci. and Nutr., Ohio Agric. Res. and Development Center, Columbus, Ohio, USA]

Spoilage of 156 pasteurized and sterilized, aseptically-packaged milk samples after 28 days at 4°C was approx. 35%; all spoiled samples had characteristic psychrotrophic off-flavours and contained Gram-positive and Gram-variable rod-shaped bacteria. Spores of psychrotrophic bacteria were isolated from 10 of 32 raw milk samples from individual producers and 18 of 20 from bulk milk tankers after heating at 80°C for 10 min, cooling and storing at 4°C for 3 wk. The majority of the isolates lost their ability to grow at 4°C after serial transfer at 21°C for several wk, but regained the ability when incubation temp. was gradually reduced to 4°C over a 12-wk period. Characteristic of 13 *Bacillus* strains from raw milk and 4 from processed milk samples did not agree completely with those of any species in the classification system of Smith et al. [USDA Monograph (1952) No. 16]. However, 2 of the strains from processed milk had characteristics of *B. coagulans* and *B. circulans* and the other 2 resembled *B. licheniformis* and *B. subtilis*, whilst strains isolated from raw milk had characteristics of 1-3 of the following: *B. coagulans*, *B. circulans*, *B. macerans*, *B. cereus*, *B. lentus*, *B. pantothenticus*, *B. negaterium* and *B. pumilus*. CDP

46

[Sordi UHT plant type Steriplak S2.] Die Sordi UHT "Steriplak S2".

Anon.

Deutsche Milchwirtschaft 26 (11) 345 (1975) [De]

This plant has a max. capacity of 20 000 l/h and runs of ≥12 h, depending on the initial quality of the product. Major steps are 1st regenerative pre-heating (4-70°C), homogenization under a pressure of 200-300 bar, second regenerative pre-heating (70-98°C), holding to stabilize the proteins, third regenerative pre-heating (95-120°C), final heating from 120° to 140°C with water at 143°C flowing in countercurrent, regenerative cooling to 120°C, removal of non-condensable gases, and regenerative cooling to about 22°C. Advantages claimed for the plant are listed. FL

47

University of Maryland is testing new free-falling-film ultra-pasteurization system.

Krebs, R. J. (Editor)

American Dairy Review 37 (1) 24, 26-27 (1975) [En] [575, Madison Avenue, New York, New York 10022, USA]

This description of the DaSi UHT sterilizer includes information on the process and equipment, which is installed at the University's dairy plant. Work is nearing completion on the 1st commercial installation of the system at a co-operative dairy plant in Michigan which will use it initially for ice cream mix, liquid milk and other dairy products. [See FSTA (1975) 7 5P1024.] FL

48

Aseptic packaging of milk and milk products. I & II.
Mann, E. J.

Dairy Industries 40 (3) 94-95; (4) 134-135 (1975)
[32 ref. En] [Commonwealth Bureau of Dairy Sci.
& Tech., Shinfield, Reading RG2 9AT, UK]

49

[Packaging of perishable and UHT products in plastics bottles.] Das Abpacken von verderblichen und haltbaren Milcherzeugnissen in Kunststoff-Flaschen.

Anon.

Verpackungs-Rundschau 25 (12) 1187-1188, 1191 (1974) [De, en, fr]

The article deals with the 'bottle-pack-aseptic-system' in which the whole process of bottle forming, filling and sealing is accomplished in a single operation; the bottle capacity is 7.5 ml to 10 l. Individual stages of the process are discussed with reference to the effectiveness of sterilization of the plastics granulate, aseptic filling of the product, and effective sealing of the filled containers. Some aspects of the arrangement and operation of complete packaging lines are outlined. FL

50

[Possibilities for manufacture of aseptic packs.]

Möglichkeiten zum Herstellen aseptischer Packungen.

Heim, W.; Jud, W.

Verpackungs-Rundschau 24 (9) 1104-1106, 1108, 1110 (1973) [8 ref. De, en, fr] [4P
Verpackungen GmbH, Kempten, Federal Republic of Germany]

Aseptic packaging of foods is discussed, with reference to: sterilization of the foods; manufacture of aseptic packs (with reference to thermal, chemical, UV and irradiation methods for sterilization of the packaging material); effects of conventional canning and aseptic packaging on the quality of foods; selection of packaging materials; and equipment for aseptic packaging. AJDW

51

[Advances in the aseptic packaging of foods.]

Fortschritte in der aseptischen Abfüllung von Lebensmitteln. [Lecture]

Voss, E.

Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, IB 159 (4) 335-351 (1974) [62 ref. De, en] [Bundesanstalt für Milchforschung, Inst. für Verfahrenstechnik, D-23 Kiel, Hermann-Weighmann-Strasse 1-27, Federal Republic of Germany]

In this review-type article the author deals with the subject with reference to packaging materials (metal cans, aerosol containers, glass, plastics) and methods of their sterilization, measures employed for maintaining sterile conditions in the packaging machines, design of aseptic packaging machines, and problems of the evaluation of aseptic processes and UHT products. FL

52

[Advances in the aseptic packaging of foods.]

Fortschritte in der aseptischen Abfüllung von Lebensmitteln.

Voss, E.

Deutsche Milchwirtschaft 26 (18) 596, 598-601, 604-606 (1975) [61 ref. De] [Bundesanstalt für Milchforschung, Inst. für Verfahrenstechnik, D-23 Kiel, Hermann-Weighmann-Strasse 1-27, Federal Republic of Germany]

53

[Aseptic milk packaging - an alternative.]

Aseptische Milchverpackung - eine Alternative.

Anon.

Molkerei-Zeitung Welt der Milch 29 (19) 511, 514-518, 521-522 (1975) [De]

Two new systems for aseptic packaging of milk developed by German companies are described and illustrated in diagrams. The first 'combibloc aseptic' fills the product continuously in 1 or 0.5 l. containers prepared from blanks consisting of paper, Al foil and plastics film. The packages are sterilized by heating and application of H_2O_2 , filled with the product under sterile conditions and sealed. The capacity of a double-row machine is 5000 units/h. Designed for plants with lower outputs is 'compak aseptic' machine with a capacity of about 1800 packages (1-l.)/h. The packaging material is also a plastics, Al and paper laminate. It is first made into a tube, from which individual packages are formed and finally separated; H_2O_2 is used as the sterilant, at room temp. A packer for use with the latter machine has a max. capacity of 36 packages/min. FL

54

Storage stability of 55° Brix orange juice concentrate aseptically packaged in plastic and glass containers.

Johnson, R. L.; Toledo, R. T.

Journal of Food Science 40 (2) 433-434 (1975)
[11 ref. En] [Food Sci. Dept., Univ. of Georgia, Athens, Georgia 30602, USA]

A study was made of the feasibility of using thermo-formed plastics containers for aseptic packaging of 55°Brix orange juice concentrate. Headspace conditions and storage temp. after sealing were varied: H_2O_2 + air, 1°C; steam + air, 8°C. Ascorbic acid half-life under these conditions was 24 and 3 wk, respectively. Similar studies, with H_2O_2 in the headspace and storage at 24°C, showed a 68% loss of ascorbic acid in 1 wk; extreme colour darkening also occurred. Studies were also carried out with glass containers (Erlenmeyer flasks), using headspaces of H_2O_2 + air, H_2O_2 + vacuum, steam + air, steam + vacuum, or no headspace + additions to the juice of 0-1000 ppm SO_2 ; storage temp. of 3-43°C were used. Half-life of ascorbic acid decreased with increasing storage temp. Similar studies, with H_2O_2 or steam in the headspace in combination with a vacuum or no vacuum and storage at 24°C, showed less rapid changes in ascorbic acid content and colour than

with plastics containers; changes were more rapid with H_2O_2 in the headspace than with O_2 . With zero headspace, 70% of the ascorbic acid was still present in glass containers after 10 wk at 24°C. At 15°C a max. storage life of 22 wk can be obtained in glass of O_2 is completely eliminated from the headspace. Flavour scores were not significantly different among reconstituted juices from concentrate stored in various plastics cups at 3°C for ≤ 10 wk. At 12 wk, flavour differences were significant, best scores being given for concentrates stored in cups made from acrylic (XT) polymer and from polystyrene/PVDC laminate. Addition of ≥ 500 ppm SO_2 produced a poor flavour score but aided colour and ascorbic acid retention. JA

55

The effect of oxygen content on flavour and chemical changes during aseptic storage of whole milk after ultra-high-temperature processing.
Thomas, E. L.; Burton, H.; Ford, J. E.; Perkin, A. G.

Journal of Dairy Research 42 (2) 285-295 (1975) [19 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Indirectly heated UHT processed milk was prepared with initial dissolved O_2 contents of 8.9, 3.6 and 1 ppm respectively, aseptically bottled, and tested at intervals during storage at room temp. for 150 days. Flavour acceptability increased to a max. after a few days, but declined slowly after about 6 days; the increase was associated with less off-flavour described as 'cabbagey', and the decrease with more 'stale' off-flavour descriptions. Milks with higher initial O_2 contents were preferred up to 8-13 days, but thereafter acceptability was independent of initial O_2 content. Sulphydryl group (-SH) contents rapidly decreased and O_2 levels correspondingly declined in the first few days as the flavour improved. Loss of -SH was lower with lower initial O_2 contents, and moderate -SH content remained in low O_2 samples for several wk. Ferricyanide reducing (FR) values did not satisfactorily measure stale flavour development. They were initially high and decreased during the first 13 days at rates dependent on O_2 content. After 20 days the FR values began to rise in high O_2 samples, but continued to decline slowly in low O_2 samples up to 90 days although stale flavour was increasing. High initial O_2 contents resulted in rapid depletion of ascorbic acid and folic acid during storage. Losses of vitamin B_{12} were small, but were higher with high O_2 contents than with low.

AS

56

A procedure and a device for the sterilization of packaging material.

Quepor, S. A.

British Patent 1 387 457 (1975) [En]

The procedure for use in aseptic packaging of products, particularly liquids, involves applying a film of a sterilizing liquid (solution containing H_2O_2) to a web and passing the web through an

atmosphere saturated with vapours of the liquid with heating to a temp. just below its bp. The purpose is to prevent or minimize H_2O_2 evaporation from the packaging material in order to prolong its contact with the material. The adhering H_2O_2 is then removed by exposure to sterilized hot dry air at e.g. 100°C. The heating may be by electric heaters. FL

57

Aseptic canning method.

Davies, E. S.

United States Patent 3 875 318 (1975) [En]

In an aseptic canning process for liquid products, the interior of the can is sterilized by introduction of a small amount of water which is converted by application of external heat to superheated steam, which escapes through a vent hole in the lid of the can. The sterile cans are cooled in a chamber containing sterilized invert gas prior to filling and sealing. HBr

58

[Fully automatic preparation of a 'bottle-pack-aseptic' line for the packaging of sterilized milk products in plastics bottles.] Vollautomatische Vorbereitung einer 'bottle-pack-aseptic' Linie zur Abpackung von vorsterilisierten Milchprodukten in Kunststoff-Flaschen.

Anon.

Deutsche Milchwirtschaft 26 (23) 775-776, 778 (1975) [De]

A description, illustrating step by step an automatic programmed in-place sterilization of bottle-pack-aseptic machines [FSTA (1974) 6 6F241], before the start of the production run is given. In a typical operation with the day shift starting at 6.00 a.m. the sterilization begins at 3.05 a.m. and finishes at about 4.37 a.m. FL

59

Aseptic packaging for pure fruit juice.

Anon.

Soft Drinks Trade Journal 28 (9) 316-318 (1974) [En]

The Aseptic Brik carton is made from a printed lamination of plastics board and Al foil, with up to 4 colours being used in the design. The laminate is supplied in reels for use with the Brik machine which fills 3600 cartons/h. By packaging juice in this aseptic carton, quality and taste are retained and the product has a life of many months without refrigeration. A description is given of the Tetra Tray system which has been developed for distributing Tetra Brik. The system consists of a tray with 2 sides which are the exact height of the carton, and the other 2 sides are only of sufficient height to form a lip which prevents the carton sliding off the tray. VJG

60

Chemical sterilants for aseptic packaging. [Lecture]

Toledo, R. T.

Food Technology 29 (5) 102, 104-105, 108, 110, 112 (1975) [25 ref. En] [Food Sci. Dept., Univ. of Georgia, Athens, Georgia 30602, USA]

This article discusses the characteristics of chemical sterilants that would be required for use in aseptic packaging; describes the characteristics of various gaseous and liquid sterilants; and concludes that a combination of heat sterilization for the aseptic packaging equipment and a hot liquid sterilant for the heat-sensitive packaging materials may be required for commercial systems. IFT

61

[UHT milk in plastics bottles at the Saint-Pere dairy.]

Fillaud, F.

Revue Laitiere Francaise No. 332, 427, 429, 431, 433 (1975) [Fr] [Laiterie Saint-Pere S.A., France]

The UHT section at the Saint-Pere dairy, France, was put into operation in Sept. 1974. Equipment comprises a Sordi UHT sterilizer (4000 l./h capacity) and a Bottle-Pack aseptic machine for packaging milk in plastics bottles at a rate of 1850/h. These are combined in batches of 12 in cartons and palletized at 720 bottles/pallet. The % of non-sterile bottles (due to bottle defects) is claimed to be very low ($\leq 0.2\%$ in certain batches). FL

62

[Dairy managers' interest in UHT milk.]

Bene, L.

Meieriposten 64 (14) 475-484, 487-489 (1975) [1 ref. No, en]

Replies to a questionnaire sent to 64 liquid milk dairies indicated that 31% could install UHT plant without relocation or rebuilding; most of these sold >8 million l. milk/yr. Both small dairies (≤ 4 million l./yr) and large dairies (≥ 8 million l./yr) could easily use Europapallets and/or roll containers. Only dairies selling >20 million l./yr could easily provide uncooled storage space for UHT milk. Older managers tended to reject a suggestion for pallet distribution based on a min. delivery of 720 l. (the content of one pallet) to each retailer, whereas younger managers tended to accept it. Managers indicated more arguments for than against UHT milk production, although the relative weight of the various arguments could not be determined. 42% of managers considered that UHT milk had a future in Norway; managers in the 40-49 and ≥ 60 age groups mostly considered that it had no future, while those in the 30-39 and 50-59 age groups were evenly divided. ADL

63

[Electron-microscope study of the effect of heat treatment on milk casein.]

Rautavaara, J.-A.; Uusi-Rauva, E.

Karjantuote 55 (10) 260-263 (1972) [16 ref. Fi]

[Dairy Inst., Helsinki Univ., Finland]

Results are discussed of an electron microscope study (using negative staining with 2% phosphotungstic acid) of changes in casein micelles occurring during normal pasteurization, vacuum pasteurization or UHT sterilization and during subsequent storage. UHT sterilization resulted in the formation of submicelles and then (after storage) large aggregates. ADL

64

[Effect of hydrogen peroxide on *Bacillus subtilis* spores.] Wirkung von Wasserstoffperoxid auf Sporen von *Bacillus subtilis*.

Cerny, G.

Naturwissenschaften 62 (6) 299-300 (1975) [4 ref. De] [Inst. für Lebensmitteltech. und Verpackung, Tech. Univ., Munich, Federal Republic of Germany]

Studies on the sporicidal effect of conc. H_2O_2 solutions (such as are used for sterilizing packaging materials in aseptic packaging of milk) showed that the survival rate of *Bacillus subtilis* spores was highly dependent on incubation temp. and incubation time. More spores survived incubation at $30^\circ C$ than at $37^\circ C$. Many spores apparently killed by 5 min treatment with 30% H_2O_2 at $24^\circ C$ were reactivated by subsequent heat treatment for 2-10 min at $80^\circ C$. Treatment at $>100^\circ C$, however, produced irreversible inactivation. No reactivation was observed at $<50^\circ C$. ADL

65

Method of and apparatus for the sterile packaging of a sterile material.

Tetra Pak International AB

British Patent 1 394 147 (1975) [En]

The process comprises passing a web of packaging material through a bath of a treatment liquid, e.g. 15% H_2O_2 solution, removing excess liquid between 2 rubber rollers, and subjecting the packaging material (at this stage in the form of a tube) to a flow of sterile air at a temp. of about $200^\circ C$ and in a direction counter to that of the advance of the tube. The product to be packaged is fed in via a central pipe; individual containers are formed by transverse sealing, separated and discharged onto a conveyor for placing into transport containers or crates. FL

66

[Technological and bacteriological measures in hygienic packaging of foods.] Technologische und bakteriologische Massnahmen bei der hygienischen einwandfreien Abfüllung von Lebensmitteln.

Voss, E.

Molkereitechnik 30, 55-60 (1975) [De]

[Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

This account deals particularly with the sources of bacterial contamination on plant surfaces, plant disinfection by steam + H_2O_2 , packaging materials (metal, glass, plastics) and their disinfection, air sterilization, measures for

maintaining sterile conditions in different types of packaging machines, and problems of the evaluation of aseptic procedures and UHT products. FL

67

[A method of checking liquid milk products in sealed packages.]

Moisio, T.; Kreula, M.

Karjantuote 56 (4) 8-9 (1973) [Fi] [Valio Lab., Helsinki, Finland]

A device developed at the Valio laboratory (Finland) for automatic quality control of UHT-treated and aseptically packaged milk products operates on the basis of electrical registration of changes in hydrodynamic properties (e.g. viscosity) due to microbial activity. It checks each package separately and automatically rejects faulty packages. It is claimed that, in principle, the method can also be used as a modified CMT. ADL

68

[Aseptically packaged long-life products.]

Anon.

Nordisk Mejeriindustri 2 (4) 149-153, 156-161, 163, 165, 184 (1975) [Sv]

Part of this issue is devoted to the topic of aseptically packaged long-life liquid milk products and their future in the Scandinavian countries. The subject is discussed in the following articles: What does aseptic packaging have to offer the Scandinavian dairy industry? (p. 149); Long-life products and their future, by J. Ekman (pp. 150-151, 160); Aseptic packaging conquers the world, by G. Vamling (pp. 152-153); Aseptic packaging is establishing itself in Finland, by G. Vamling (pp. 156-167); Pure-Park aseptic packaging has come to stay, by G. Vamling (pp. 158-160); and Distribution of dairy products, by L. G. Lundqvist (pp. 161, 163, 165, 184). ADL

69

A laboratory-scale ultra-high-temperature milk sterilizer for batch operation.

Perkin, A. G.

Journal of Dairy Research 41 (1) 55-63 (1974) [11 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The design and operation of a laboratory-scale UHT sterilizer (using the milk-into-steam direct heating process) capable of treating 0.5-l. quantities of milk are described. Temp. control, sporicidal efficiency and change of composition of the milk during processing are discussed. AS

70

[UHT-sterilized milk aseptically packaged in Tetra Brik.]

Gandon, Y.; Petit, A.; Dechy, M. F.

Lait 54 (539/540) 645-655 (1974) [14 ref. Fr,

en] [Lab. Dept. des Services Vet., Val-de-Marne, France]

Tetra Brik cartons of UHT-sterilized milk were obtained from 3 dairies using different heat treatments. Milks A and B were directly heated at 150°C for 2.5 and 2 respectively; milk C was indirectly heated at 138-140°C for 3-4 s. After storage at 55°, 30° or 7°C for 10 or 20 days or at room temp. for up to 75 days, the cartons were examined for bacteria phosphatase activity and by the turbidity and alcohol tests. All 156 samples tested were sterile and gave negative alcohol tests. Some reactivation of phosphatase was observed, especially in samples stored at 30°C for 20 days. The organoleptic properties of the samples were good. Only after prolonged storage at room temp. was a slight oxidized flavour detected in the milk. The turbidity test was positive for milks A and B, but 44% of milk C samples gave a negative result which meant that they did not conform to the IDF definition that UHT milk must give a positive turbidity test. The Tetra Brik cartons have the advantage of easy opening and manipulation, and the rigidity allows the cartons to be packed in palettes of 720 cartons. MEG

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FAB 10

ASEPTIC PACKAGING

SELECTED FROM VOLUME 8

FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Institut für Dokumentationswesen, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen; Zentralstelle für maschinelle Dokumentation—Frankfurt am Main.

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Titles of the FABs now available are given on the back cover of this booklet. New titles are being added at the rate of about 10 per year. For up-to-date lists of FABs or suggestions for new topics please write to the address given overleaf. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each month's abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

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H. BROOKES

ASSISTANT EDITOR

[Objections to the use of the diethyl ester of pyrocarbonic acid for cold sterilization of beverages.] Zur Frage nach der Bedenklichkeit der Verwendung des Pyrokohlensäurediäthylesters zur Kaltentkeimung von Getränken.

Milhes, K.

Flüssiges Obst 42 (4) 123-124 (1975) [6 ref. De] [Forschungsanstalt für Weinbau, Gartenbau, Getränketech. und Landespflege, Geisenheim, Federal Republic of Germany]

Objections to the use of diethyl pyrocarbonate for sterilization of wines, beers and fruit juices (because of formation of the carcinogenic compound ethyl urethane) are discussed, with reference to: the low level of carcinogenic activity of this compound; the rapid metabolism and excretion of ethyl urethane ($\geq 90\%$ excreted in 24 h); and factors influencing ethyl urethane formation in beverages (diethyl pyrocarbonate dose, and the NH_3 content and pH of the beverage). It is concluded that the ethyl urethane concn. actually present in diethyl pyrocarbonate-treated drinks are too low to present a significant health hazard. AJDW

2

[Sterilization with ethylene oxide.] [Review]

Driessen, F. M.; Duin, H. van

Voedingsmiddelentechnologie 8 (32/33) 15-19 (1975) [60 ref. Nl] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Aspects considered in this review on sterilization of foods and packaging materials with ethylene oxide include: the mechanism of the bactericidal activity of ethylene oxide; factors influencing the bactericidal activity of ethylene oxide (temp., concn., moisture content of the substrate, penetration of ethylene oxide into the substrate); sterilization of foods; removal of ethylene oxide residues after sterilization; detn. of ethylene oxide residues; toxicity of ethylene oxide; and reaction products of ethylene oxide. AJDW

3

[Operational problems of aseptic packaging of dairy products in plastics packages.] Verfahrensfragen beim aseptischen Abpacken von Molkereierzeugnissen in Verpackungen aus Kunststoffen. [Conference proceedings]

Anon.

Verpackungs-Rundschau 26 (5, Tech. Wiss. Beil.) 35-40 (1975) [De]

Brief accounts are given of papers presented at a symposium held at the Institute for Food Technology and Packaging, Technical University, Munich, on 21 June, 1974, including: Preparation of the product and aseptic packaging, by B. Hampel; Aseptic packaging of milk and dairy products: causes of disturbances and faults, by G. Stehle; Principles of microbiological control of UHT plants, by M. Busse; Experience with the

construction of plants for aseptic packaging in relation to ease of cleaning, by K. H. Ertl; Measures for obtaining clean air during the filling operation, by P. Schmeer; Experience with the sterilization of packages for aseptic packaging employing hydrogen peroxide, by W. Schindler; and Experience with the sterilization of coated aluminium strips using special UV lamps, by W. Sturm. FL

4

A new method of aseptic filling.

Hahn, G.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 172-175, 181 (1975) [En, Da, De] [Ganzhorn & Stirn, Schwäbisch Hall, Federal Republic of Germany]

Details are given of an aseptic forming, filling and sealing prototype machine employing sterilization of the inside surfaces of cups and lids with H_2O_2 and subsequent drying with hot air at 130°C with concurrent cooling on the outside to prevent overheating. The filling is by a special metering pump which can be cleaned and steam-sterilized at 140°C without dismantling. The containers are sealed under a slight vacuum. The machine is completely enclosed and is kept at a pressure slightly above atmospheric to prevent the inflow of outside air. A commercial version with a capacity of 12 000 cups/h is being developed. FL

5

Also aseptic milk in jugs.

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 182, 187 (1975) [En, Da, De]

A brief description is given of the Prepac IS4 Aseptic machine for packaging UHT milk in sachets of plastics laminate. The operation involves sterilization of the packaging material with H_2O_2 and filling and sealing of the sachets formed from 2 strips of a plastics laminate. The hourly capacity is 2500 packages of 0.125-1.00 l. vol. FL

6

A French method of aseptically filling milk in plastic bottles in a new way.

Berry, J. L.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 166-171 (1975) [En, Da, De] [Remy et Cie, Dreux, France]

A system for aseptic filling of milk in plastics bottles developed by E. P. Remy, France, comprises basically 2 major steps, i.e. manufacture of plastics bottles which are sealed and sterile inside and filling of the bottles in a sterile chamber. The bottles are made in special moulds to ensure that they are sterile internally from a special material gased on high-density polyethylene with additives to provide additional protection against UV light and microorganisms. On the way into the sterile chamber the bottles are sterilized externally by passage through a lock containing a sterilizing liquid; then in the chamber their necks are trimmed

and the bottles are filled with the product by a volumetric filler, capped and sealed. Cleaning and sterilization procedure involves the use of a mixture of water and poly-alcohols which has a bp of 160°C at atmospheric pressure. This enables the sterilant to be used as vapour or liquid. Effective sterilization is ensured by maintaining the coldest point in the circuits at 130°C for several min. With a prototype plant operating under semi-industrial conditions at a dairy, of 50 214 filled properly sealed bottles 0.008% were found to be not sterile on storage at 30°C. FL

7

Systempak's new aseptic filler resembles something we know.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 183-187 (1975) [En, Da, De]

An illustrated description is given of the Systempak process for aseptic packaging of UHT milk at a rate of 2500 packages (1 or 0.5 l.)/h. The operation involves sterilization of the inner side of the strip of packaging material with H_2O_2 on a heated cylinder, folding the strip, shaping and filling and welding to produce individual packages which are separated and removed from the machine. The packages are brick shaped. Information is also given on control arrangements, sterilization of air, and pre-sterilization of the machine which is programmed and takes 35 min to carry out. FL

8

The aseptic filling of coffee-cream in cups.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 161-165 (1975) [En, Da, De]

Details are given of the operation of Hamba aseptic machines for filling cream in pre-fabricated single-portion cups of 7-25 g product wt. The process comprises essentially the steps of sterilizing the cups with H_2O_2 and subsequent evaporation of the sterilant with sterile air at 100°C, filling and sealing. All lids are sterilized by a brief heating in a sterile chamber which is under a slight positive air pressure to prevent the inflow of contaminated outside air. The chamber is sterilized initially by circulation of H_2O_2 vapour and then dried by sterile air, in an automatically controlled operation. The machines are available for use for coffee cream with a max. of 8 parallel filling lines (cup diam. 46 mm, content 7-25 g), and desserts and similar products (4-5 lines). As far as the sterility of the operation of this system is concerned, the author refers to a communication from Verbandsmolkerei Berne where during 1 Oct. 1973 to 31 Jan. 1974 of a total of >18.8 million cups of coffee cream produced experimentally on 2 machines 99.89% were sterile. FL

9

Improvements in and relating to the aseptic packaging of materials.

Tetra Pak Development SA

British Patent 1 400 112 (1975) [En]

A packaging system is described in which the containers are moulded by a thermoforming process, filled with the products, closed and sealed under aseptic conditions. FL

10

The bottle-pack-system from Rommelag.

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 191 (1975) [En, Da, De]

A very brief description is given of the Bottle-pack 305 machine for aseptic packaging of milk in 250, 500 and 1000 ml plastics bottles at max. rates of about 3000/h. Low and high density polyethylene, polycarbonate, polystyrene, acetate etc. may be used as the packaging material. FL

11

[Optimization of heating parameters and constructional characteristics of equipment for UHT sterilization of milk.]

Stanisic, S.

Mljekarstvo 25 (4) 74-78, (5) 101-111 (1975) [7 ref. Sh] [Tech. Fak., Zagreb, Yugoslavia]

Details are given of a process and of a project for an installation for UHT sterilization of milk (capacity 3600 l/h) to be made from components manufactured by the Yugoslav food machinery factories. FL

12

Effect on milk of UHT-sterilization with the direct Stematic Longrun.

Corradini, C.; Bottazzi, V.; Bonomi, E.

Scienza e Tecnica Lattiero-Casearia 26 (2) 73-87 (1975) [8 ref. It, En] [Dipartimento per Ricerche Lattiero-Casearie, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Milk treated by UHT Stematic Longrun sterilizer was examined for changes in chemical composition and effectiveness of sterilization, and the deposits formed in the system were analysed. With increasing severity of treatment from 140-142°C for 2 s to 145°C for 5 s, apparent casein content increased regularly and β -lactoglobulin decreased. Recycling of milk increased these effects. Sterilization as investigated by the International Dairy Federation using Aschaffenburg turbidity test was complete in all cases. The deposits, slight at the injection head but more considerable at the outlet filters, were high in protein indicating that protein denaturation occurred chiefly during sterilization. The limited compositional changes observed appear to be comparable to those induced by pasteurization. GTP

13

Characteristics of Mozzarella cheese made by direct acidification from ultra-high-temperature processed milk.

Schafer, H. W.; Olson, N. F.

Journal of Dairy Science 58 (4) 494-501 (1975)

[35 ref. En] [Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Skim-milk was heated indirectly at 80°, 90°, 100°, 110°, 120° and 130°C for 2 s, cooled to 4-5°C within 20-24 s and held for 24-48 h. It was standardized to 2% fat with 20% cream (homogenized at 136 kg/cm², pasteurized at 63°C/30 min) and was used to make Mozzarella cheese by the direct acidification procedure. With UHT milk with up to 35% whey proteins denatured (the 2 highest heat treatments) there was greater recovery of milk proteins in the cheese, resulting in a 3.4% increase in cheese yield, and no adverse effects on fat retention in the curd, proteolysis during storage, and sensory and rheological cheese characteristics. SAB

14

Gel formation behaviour in UHT sterilized milk.

Corradini, C.

Milchwissenschaft 30 (7) 413-416 (1975) [21 ref.

En, de, fr, es] [Istituto di Chimica Agraria, Univ. del Sacro Cuore, Piacenza, Italy]

Al-lined Tetrapak cartons of UHT sterilized milk (preheated to 78°C and then rapidly heated by steam injection to 140°C for 2 s) were stored at room temp. and examined at monthly intervals. From a study of starch gel electrophoresis patterns of isoelectric casein and gels obtained from the milks after different storage periods, it was found that breakdown of the casein continued after gel formation had begun. Measurement of the distribution of N between casein, non-protein, proteose-peptone, globulin, β -lactoglobulin and albumin fractions also indicated that the slow coagulation of casein can be considered as an enzymic process. MEG

15

New developments in UHT milk processing.

[Review]

Lang, F.; Lang, A.

Milk Industry 77 (4) 5-6 (1975) [6 ref. En]

Commonwealth Bureau of Dairy Sci. & Tech., Shinfield, Reading RG2 9AT, UK]

In this article, based on literature data and impressions from visits to various countries, the authors survey recent developments in UHT market milk (variants of different fat content and protein enriched); flavoured UHT milk products (fruit, chocolate and other dairy-based beverages) and technological aspects of their preparation; UHT puddings and a method for their production; UHT ready-to-use infant foods; and concentrated UHT foods ready to use without dilution with water, destined for famine relief. FL

16

PKL - now in the market for aseptic milk.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 176-181 (1975) [En, Da, De]

This article deals mainly with the combibloc aseptic packaging machine (Papier und Kunststoff-Werke Linnich GmbH, German Federal Republic) which forms the packages from prefabricated paper sleeves, supplied as flat blanks. After welding on the base, the packages enter the sterile zone maintained under a constant positive pressure of cold sterile air. There they are sterilized by spraying into them a 35% H₂O₂ solution, dried, filled with milk and sealed. The finished packages are normally rectangular but the machine may be adjusted to produce gable-top cartons. The hourly capacity of the new PKL combibloc aseptic machine is 500 units of 1 or 0.5 l. size. FL

17

The packaging of sterile dairy products with Pure-Pak aseptic.

Tunge, M.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 192-195 (1975) [En, Da, De] [Elopak, Oslo, Norway]

The Pure-Pak aseptic NLL machine is equipped with an aseptic filler, a top seal unit, and a spray system that sterilizes the inside surfaces of the packages with H₂O₂ immediately after the container base has been formed and welded on. The cartons are filled 2 at a time; the sizes are 1, 0.5, 0.30 and 0.25 l., the adjustment taking only a few minutes. In the Moha dairy in Frankfurt am Main corrugated cardboard boxes and pallets are used for supplying UHT products to shops. In addition to UHT milk with 3.5 and 1.5% fat and skim-milk, the dairy produces chocolate milk with 1.5% fat. FL

18

Experiences with machines for the aseptic filling of milk products in deep-drawn plastic packages.

Kaufmann, -.; Linke, D.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 188-190 (1975) [En, Da, De] [Benz & Hilgers, Düsseldorf, Federal Republic of Germany]

Various aspects of the development and application of Benhil-Formseal aseptic packaging machines are dealt with. The process comprises sterilization of a strip of the packaging material by passage through a bath of H₂O₂ with subsequent heating, and moulding the containers, filling and sealing them using Al lids sterilized in H₂O₂, under aseptic conditions. The machines are now available in several capacities (per h), e.g. 12 000 cups (0.25 l.), 7000 cups (0.5 l.) and 3500 cups (one l.) for packaging UHT milk and cocoa, 5000 and 12000 cups for whipping cream in 200-250 cm³ container sizes and 25 000 portion cups (10 g) for coffee cream. The machines are also suitable for aseptic filling of cold sterile dessert products. Advantages include the possibility of successively filling several products into the same container, e.g. puddings

topped with a sauce, producing multi-packs comprising containers with different types of desserts, and selection of package shape best suited to a particular product. FL

19

Aseptic systems.

Frölich, M.

Nordeuropäisch Mejeri-Tidsskrift 41 (5) 200-202 (1975) [En, Da, De] [Ingenieurbureau Fröhlich, Gümligen, Berne, Switzerland]

The author deals with fittings and components developed by the Company for use in UHT processing lines. They include (i) the Frölich aseptomat valve (special valve having a stainless steel bellows as seal between the stationary and moving components and having a Teflon O-ring as the valve seat; it can withstand a system pressure of 6 atm. and operating temp. of 150°C over prolonged periods), (ii) completely automated sterile tanks with max. capacities of 30 000 l., (iii) Frölich-Aseptic-System for the new aseptic Hamba cup filling and sealing machine as well as the automatic equipment and when necessary the appropriate automatic cleaning and sterilizing plant, and (iv) Frölich 'Valveknot' valve assembly consisting of 2 product valves and a steam valve and a condensate valve (for sterilization) and having a sterile chamber via which 2 separate sterile systems may be connected up or disconnected. The provision of a control unit for each valve assembly enables the overall operation control of the plant to be expanded on the module principle; the control units provide signals for controlling filling machines, UHT plants and sterile tanks. FL

20

[Sterile packaging in the food industry. I. Beer, wine, fruit juices, fruit juice-based drinks and lemonades.] Sterilverpacken in der Lebensmittelindustrie. I. Bier, Wein, Fruchtsäfte, Fruchtsaftgetränke und Limonaden. [Review] Andris, M.

Schweizer Brauerei-Rundschau 86 (9) 173-179 (1975) [63 ref. De] [Inst. für Lebensmittel-Wissenschaft, Eidgenössische Tech. Hochschule, Zürich, Switzerland]

This detailed review deals with definition and methods of sterile packaging; and with sterile bottling of beer, wine, and fruit juices, fruit juice-based drinks and lemonades. References are given separately for each commodity group. SKK

21

[Aseptic machine ready for use at the start of the shift.] Aseptik-Maschine zu Schichtbeginn einsatzbereit.

Zimmermann, L.

Neue Verpackung 28 (9) 1172, 1174, 1176, 1178 (1975) [De]

It is pointed out that a disadvantage of aseptic packaging processes is the need for time-consuming preparatory measures to ensure sterility before starting up after a shutdown; time lost on cleaning

and sterilization can represent 27.1% of an 8-h shift. Processes employed to eliminate this disadvantage on an aseptic line for packaging sterilized milk products in plastics bottles, resulting in virtually 100% utilization of available capacity are described. ADL

22

[Determination of costs in dairy departments in relation to capacity and utilization. IV. UHT-milk department.] Bestimmung des Kostenverlaufs von Molkereiabteilungen in Abhängigkeit von der Kapazitätsgrosse und -auslastung. IV. H-Milch-Abteilung.

Behme, G.

Milchwissenschaft 30 (5) 282-290 (1975) [De, en] [Inst. für Betriebswirtschaft und Marktforschung der Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

A special form of cost accounting was used to determine UHT milk production costs at capacities of 3300, 6600 and 9900 one-litre packages/h, with varying degrees of capacity utilization. For annual production ranging from 2.9 to 53.6 million units, costs/package ranged from 30.65 to 18.85 Pfennig. Degree of capacity utilization had a much greater effect in reducing costs than actual capacity. ADL

23

1st aseptic low-sodium milk for hospitals. Anon.

Food Engineering 47 (6) 57 (1975) [En]

Milk suitable for feeding to patients on low-sodium diets is prepared from fresh, cooled raw milk after standardization with respect to butterfat. The milk is passed through an ion-exchange bed containing a sulphonated polystyrene resin where the Na⁺ is exchanged for K⁺; after homogenization and UHT-sterilization (300°F for 2.5 s) the milk is cooled and aseptically packaged in 0.5-pint containers. The product contains 2.5 mg Na, 225-250 mg K and 100-125 mg Ca/100 cm³, and composition of the major constituents of the milk remains unchanged (5% carbohydrate, 3.5% protein and 3.4% butterfat). DMK

24

[Preserved milks.]

Anon.

Technique Laitiere No. 862 (Hors-Ser.), 15-16, 18, 21, 25, 27, 29-32, 37-38, 41, 43, 45-47, 49, 51, 53-55, 57-58, 61, 63-65 (1975) [Fr]

This special issue includes the following articles: Traditional sterilized milks, by G. Odet (pp. 21, 25, 27); UHT milks, by J. Pien (pp. 29-32); Packaging of UHT milk, by J. Desirant (pp. 37-38, 41); Principles and recent developments in spray-drying, by J. R. Hilaire (pp. 43, 45-47); Reconstituted milks, by G. Cherrey (pp. 49, 51, 53-55); Instant milks (pp. 57-57, 61); and Packaging of sterilized, concentrated and dried milks (pp. 63-65). FL

25

Hygienic control of UHT milk.

Lück, H.

South African Journal of Dairy Technology 7 (3) 173-178 (1975) [6 ref. En, af] [Anim. & Dairy Sci. Res. Inst., Irene, Transvaal, S. Africa]

The discussion considers hygiene aspects from the milking shed to the final product of UHT milk. Emphasis is placed on the raw or industrial milk quality used for UHT processing; stability and quality tests to ensure that UHT milk complies with its definition; dangers of spoilage; and checks on sterility by sampling packages for UHT milk.

LMB

26

Foods of the future. II.

Barrat, B.

Food in Canada 35 (9) 29-32 (1975) [En]

The food needs of the foreseeable wordy world population and likely methods of their being met are discussed. Topics include: ocean bottom grain storage; improved fish resource utilization; increased use of agricultural, processing, and forestry industry wastes for animal feeds; new and more nutritious grain var.; and various energy-saving measures, e.g. reduced frozen food activity, reduction in overpackaging and increasing use of aseptic filling methods. JRR

27

[Use of infrared radiation for preliminary heating of glass containers in the aseptic bottling process.]

Mikhel', M. I.; Shapil'skii, M. Ya.

*Konservnaya i Ovoshchesushil'naya**Promyshlennost'* No. 11, 22-23 (1974) [2 ref. Ru] [Odesskoe SKTB "Prodmarsh", USSR]

This type of conservation is suitable for baby food and dietetic food, as the food biological value is better retained than by prolonged and often imperfect heating of the product in a glass container. Sterilization of empty glass jars size No. 58-1 by hot air (250°C) was laboratory-tested. Prior to sterilization, the container temp. was 90°C; it was heated up in 8 min to 160°C, and sterilized by holding for 5 min. Infrared radiators KI 220-1000, horizontally arranged in a tunnel, proved better. This technique was tested to sterilize size No. 58-1 containers made from colourless and greenish glass. The sterilization temp. was 180-190°C; the colourless glass containers were heated to 160°C (the initial temp. being 90°C) in 3.5 min; the greenish glass containers needed 2.5 min. Temp. measurement with thermocouples is described. The infrared heaters raised the temp. 2-3 × more rapidly than the hot air. STI

28

The system of aseptic filling fills a meaningful role in the distribution of milk.

Nilsson, S.

Nordeuropaeisk Mejeri-Tidsskrift 41 (5) 156-160 (1975) [En, Da, De] [Tetra Pak International, Lund, Sweden]

Developments in aseptic packaging of milk in Tetra Pak containers are traced and factors which contributed towards the expansion of the process in developed and developing countries are discussed. Data on the market share of UHT milk in selected European countries are given in tabular form. Compared with 1973, in 1974 this share in relation to the total vol. of packaged market milk increased most rapidly in Belgium (+160%), Germany (+50%), Switzerland (+35%), Spain (+31%), France (+30%), and Italy and the Netherlands (+20%). FL

29

[SIDEL system of aseptic packaging.]

Anon.

Revue Laitiere Francaise No. 337, 789 (1975)

[Fr]

A brief description is given of the SIDEL system for aseptic filling of milk into plastics bottles, with an hourly capacity of 1200-1500 bottles of round, square or polygonal shape, each weighing 25-30 g. It comprises a pressurized sterile chamber in which the bottles are made, opened by cutting of the tops, filled with milk, and sealed with Al foil. The system is undergoing factory trials concerned in particular with aseptic aspects and the possibility of high degree of mechanization. FL

30

[Studies of organoleptic, chemical and nutritional quality of different types of market milk in different packages.]

Untersuchungen über die sensorische, chemische und ernährungsphysiologische Qualität verschiedener Konsummilchsorten in unterschiedlichen Verpackungen.

Renner, E.; Schmidt, R.

Deutsche Milchwirtschaft 26 (45) 1620, 1623, 1626, 1628-1629 (1975) [7 ref. De]

[Milchwirtschaftliche Abteilung der Justus-Liebig- Univ., Giessen, Federal Republic of Germany]

Organoleptic tests carried out by the tetrad method [see FSTA (1973) 5 8A394] showed that all types of UHT milk examined (3.5 or 1.5% fat; direct process (DP), packaged in paper; indirect process (IP), packaged in carton or plastics) differed significantly in taste from pasteurized milk (3.5 or 1.5% fat), whether homogenized or not; DP milk proved more satisfactory in this respect than IP milk; and sterilized milk was found inferior to the other milks tested. IP milk with 3.5% fat stored at room temp. showed organoleptic changes already within the guaranteed storage life, whereas changes could not be detected in IP milk with 1.5% fat or DP milk with 3.5 or 1.5% fat. The total quantity of free fatty acids frequently increased during the guaranteed storage life at room temp. of UHT milk irrespective of type, resulting in perceptible sensory changes. Ascorbic acid content of IP milk was initially approx. 12 mg/l. and decreased rapidly to values of approx. 3 mg/l. after storage for 4 wk at 7, 20 or 38°C, whereas the initial content of approx. 22 mg/l. in DP milk remained stable for nearly 6 wk; it was approx. 8.5 mg/l. in sterilized milk and decreased only to approx. 6 mg/l. after 8 wk. [See also FSTA (1974) 6 6P764.] SKK

31

[Hydrogen peroxide on aseptic packaging of foods.] Wasserstoffperoxid beim aseptischen Abpacken von Lebensmitteln.

Schwarzer, H.; Schindler, W.

Verpackungs-Rundschau 26 (9) 1144, 1146-1147 (1975) [De, en, ru] [Peroxid-Chemie GmbH, Hölfigelskreuth, Federal Republic of Germany]

32

[Detection of H_2O_2 in UHT milk.] Zum Nachweis von H_2O_2 in UHT-Milch.

Lechner, E.

Zeitschrift für Lebensmittel-Untersuchung und -Forschung 159 (1) 39-42 (1975) [7 ref. De, en] [Südd. Versuchs- und Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

Presence of H_2O_2 in UHT milk can be conveniently determined qualitatively by PERID-Test tablets and more quantitatively by the lactoperoxidase reaction. H_2O_2 added to UHT milk disappears fairly rapidly, additions of 70, 142 and 214 mg/l. UHT milk being just detectable 1, 2 and 6 days later respectively. Rapid disappearance during the first few days is apparently due to oxidation of ascorbic acid, the initial UHT milk content of which is similar to that of untreated milk. Absence of ascorbic acid from UHT milk within some days of manufacture thus suggests that H_2O_2 , even if not detectable at that moment, had been earlier added to the milk. GTP

33

[Proteolysis of milk and milk products by *Pseudomonas fluorescens*.] Proteolyse von Milch und Milchprodukten durch *Pseudomonas fluorescens*. [Lecture]

Kielwein, G.

Milchwissenschaft 30 (10) 605-606 (1975) [De, en] [Abteilung Hygiene der Milch, Fische & Eier, Univ. Giessen, Federal Republic of Germany]

Brief information is given on experiments with 2 variants of *Pseudomonas fluorescens*, subsp. *anhaem.* and *haem.* They grow well in milk, producing however little enzyme at $<8^\circ\text{C}$; the proteases were not active at $\text{pH} < 5.4$. Proteolysis affected particularly α_s -casein and β -lactoglobulin. The proteases were relatively heat-stable, and it is considered that even UHT processing may not ensure complete inactivation of *Ps. fluorescens* proteases. FL

34

[Competitive relationship of pasteurized and UHT processed milk as reflected in costs, prices and consumption.] Das Konkurrenzverhältnis von pasteurisierter und H-Milch im Spiegel von Kosten, Preisen und Verbrauch.

Drews, M.

Molkerei-Zeitung Welt der Milch 29 (43) 1203-1209 (1975) [1 ref. De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

This lecture, presented at a meeting of dairy advisors in Kiel in Oct. 1975, deals with the present consumption position, retail prices and other factors affecting the consumption ratio between the 2 types of milk, production and marketing costs, and the competitive position of the 2 types and its effect on price structure. SKK

35

[Use of titanium metal ceramic filters for purifying steam in milk sterilization.]

Kosmachevskii, B. P.; Khodovtseva, L. A.;

Pletinskii, A. I.

Molochnaya Promyshlennost' No. 10, 19-20 (1975) [Ru] [Vses. Nauchno-issled.

Ekspierimental'no-Konstruktorskii Inst.

Prodvol'stvennogo-Mashinostroeniya, USSR]

A filter element made from titanium alloy and ceramics was incorporated into commercial lines for the production of UHT aseptically packaged milk. It effectively purified steam over 4-5.5 months when examination revealed blockage of the pores and rapid increase in steam pressure. The filter was cleaned with 2% solution of nitric acid and by blowing with compressed air. The period of use was 7 times longer than for porous carbon filters and the filter is recommended for treating steam in milk sterilizers. FL

36

U.H.T. milk introduced in Canada.

Anon.

Dairy and Ice Cream Field 158 (11) 20-21, 52 (1975) [En]

A Canadian dairy (Laiterie Cite Limite) is introducing into the Quebec city market UHT milk processed on the Sterideal plant and packaged aseptically in 1-l. Tetra brick cartons. The milk contains 2% butterfat and is fortified with vitamins A and D in conformity with government requirements. Distribution is in 4-l. multipacks which are stacked on standard pallets, each accommodating 1224 l. milk. FL

37

Age gelation of ultra-high-temperature milk.

Zadow, J. G.; Chituta, F.

Australian Journal of Dairy Technology 30 (3) 104-106 (1975) [15 ref. En] [Dairy Res. Lab., Div. of Food Res., CSIRO, Highett, Victoria, Australia]

The effects of pH, pre-heat treatment, processing conditions and storage temp. on the period required for the onset of age gelation in UHT milk were determined. Varying the pH of the raw milk in the range 6.6 to 7.2 did not affect gel time. Increased severity of the UHT process, either as a result of increased sterilization temp., or holding time resulted in increased gel time. Pre-heating raw milk also extended gel time, greater effects being obtained with increasing severity of the treatment. Incubation of the raw milk for 4 h at 30°C did not affect gel time. Gel times varied from more than 208 days at 2° or 40°C storage temp., to a min. of 99 days at 25° and 30°C . AS

38

Apparatus for sterile packaging.

Reil, W. (Altstädter Verpackung-Vertriebs GmbH)

British Patent 1 414 241 (1975) [En]

The process for aseptic packaging of foods in particular milk comprises essentially forming a tube from a web of flexible material (paper, plastic etc.), partly filling the tube with the product and forming the filled tube into a closed container by transverse seaming. The system incorporates pipes for feeding sterile air onto a side of the web which will form the inside of the tube and also into the open top of the formed tube to create an air cushion at a constant pressure (180 mm water column) and a temp. of 130°C. Provision is also made for using H_2O_2 as the sterilizing agent. FL

39

The idea, which became a world-project. [Lecture] Rausing, H.

Nordeuropaeisk Mejeri-Tidsskrift 41 (9) 307-314 (1975) [En, Da, De] [Tetra Pak AB, Lund, Denmark]

The author deals with developments in the Tetra Pak system of milk packaging and the effects of aseptic packaging on distribution and products development. He mentions aseptically packaged soybean milk produced in S. E. Asia, Brazilian school milk based on soy protein and having chocolate taste, and the possibility of hydrolysing lactose in UHT milk with lactase for consumption by populations suffering from lactose intolerance. FL

40

[Selection and research of protective coatings for aseptic automatic milk packaging.]

Kosmachevskii, B. P.; Klyachko, G. M.

Trudy Vsesoyuznogo Nauchno-Issledovatel'skogo I Eksperimental'-nokonstruktorskogo Instituta Prodovol'stvennogo Mashinostroeniya No. 38, 62-64 (1974) [Ru]

Protective paint coatings were investigated for application to aseptic packaging of milk. They were phenol alkyde resins FA-737 and FA 792, epoxy resins EP-773, EP-711 and EP-140 and perchlorvinyl coatings KHV-113, KHV-124 and KHV-238. The phenol alkyde coatings were applied in a single layer, with 180°C drying temp. for 60 min; the epoxy resins were applied in a single layer with a variety of temp. (20-30°C) and times (6-24 h) of drying. The perchlorvinyl coatings were applied in 2 layers, each layer being dried for 1.5, 2 and 24 h at 20°C. The effect of 3% lactic acid, 15% hydrogen peroxide and 2% NaOH at 20 and 80°C was investigated. The most resistant to the action of the 3% lactic acid solution were the coatings based on FA-792 and KHV-124; the greatest resistance to 2% NaOH (washing solutions) was exhibited by coatings based on FA-792, EP-140 and KHV-124 (at 20 and 80°C); coatings based on FA-792, KHV-113 and KHV-124 were most

resistant to 15% hydrogen peroxide. The best protective properties are those in the coatings based on the phenol alkydes (FA-792), dried for 15 min at 20°C, followed by drying for 60 min at 180°C. The next are the perchlorvinyl coatings, dried at low temp. The coatings were tested under manufacturing conditions the FA-792 was recommended for aseptic milk packaging lines owing to its exceptionally good corrosion resistance and decorative appearance. STI

41

[Sterile packaging in the food industry. II. Milk and milk products, special products.] Sterilverpacken in der Lebensmittelindustrie. II. Milch und Milchprodukte, Spezialprodukte.

Andris, M.

Schweizer Brauerei-Rundschau 86 (10) 199-205 (1975) [44 ref. De, fr, en] [Eidgenössische Tech. Hochschule, Zürich, Switzerland]

This authoritative review deals primarily with the numerous procedures for sterile packaging of milk and milk products and is also concerned with the sterile packaging of various other products with particular attention to packaging of vegetable juices, soups, sauces, and other liquid foods. [See FSTA (1976) 8 3F141.] SKK

42

Aseptic packaging of foods.

Robinson, D. V. (Rosini, D. A.)

United States Patent 3 891 779 (1975) [En]

The process, applicable to milk, chocolate-flavoured puddings and other foods, involves sterilizing the food or taking a presterilized food and packing it under aseptic conditions into presterilized containers, the latter step being carried out in a chamber which has been presterilized by spraying it with an organic I-containing agent (Mikrolene DF) before introducing sterile filtered air and maintaining a pressure above atmospheric throughout the filling process. The process as applied to milk involves sterilizing the milk at 300°F for 4 s, cooling to 40°F and filling into presterilized Al containers before sealing with presterilized paper/polyvinyl chloride laminated Al lids. EJM

43

[Aseptic packaging of milk - problems of the microbiology of the package.] [Review]

Cerf, O.

Revue Laitiere Francaise No. 340, 149-151, 153, 155-156 (1976) [37 ref. Fr, en, de] [Lab. de Biochimie Microbienne, Inst. Nat. de la Recherche Agron., 78350 Jouy-en-Josas, France]

44

Hermetic sealing process utilizing multiple heat-sealing steps.

Komatsu, Y.; Kakuta, I. Z.; Yamaguchi, K. (Toyo Seikan Co. Ltd.)

United States Patent 3 930 041 (1975) [En]

A hermetic sealing process for forming a heat-sterilizable packaged article is described. A container, which has a heat-sealable resin coating on the inner surface of an area to be heat-sealed is filled with cooked or semicooked foods in liquid under such an atmosphere that a condensable vapour or condensate seals the inner faces. IFT

45

[Pasteurized and UHT processed whipping cream - improvement of its firmness and elimination of serum separation.] Schlagrahm (pasteurisiert, ultrahocherhitzt) - Verbesserung der Festigkeit, Vermeidung des Absetzens.

Kammerlehner, J.

Deutsche Molkerei-Zeitung 95 (48) 1758-1761; (49) 1789-1792; (50) 1820-1825 (1974) [45 ref. De, en]

The preparation of pasteurized and UHT-processed whipping cream was investigated to determine conditions favouring elimination of slow whipping and serum separation and improvement of firmness. Optimal result were obtained by use of low separating temp. (<45°C, best 10°C) of freshly cooled milk, adjustment of cream to pH 6.3-6.4 (preferably by addition of ripened buttermilk) shock cooling of the pasteurized cream and storage at 2-5°C pending whipping. Supplementary treatments for UHT cream included milk homogenization at 28-30 kgf/cm² and 60-70°C (or preparation of the cream by skimming milk homogenized at 40-60 kgf/cm² and 65°C) to obviate plug formation, and addition of 0.5% freeze-dried ripened buttermilk or 0.1% calcium lactate, or both but with less lactate (0.05%), to improve firmness, provided of course use of such additives is permissible. GTP

46

Ultra-heat treatment of dairy products.

Zadow, J. G.

CSIRO Food Research Quarterly 35 (2) 41-47 (1975) [17 ref. En] [CSIRO Div. of Food Res., Highett, Victoria, Australia]

The following aspects of UHT treatment are considered: 'direct' and 'indirect' UHT processing; formation of deposits in UHT plants; aseptic packaging; characteristics of UHT milk (nutritive value, storage life, flavour); and UHT whipping cream. VJG

47

[Market analysis of packaging of pasteurized and UHT milk in the Federal Republic of Germany in 1974.] Marktanalyse der verschiedenen Verpackungsarten von pasteurisierter und ultrahocherhitzter Konsummilch in der

Bundesrepublik Deutschland 1974.

Longuet, D.

Deutsche Molkerei-Zeitung 97 (4) 78-81 (1976) [De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

The situation in the packaging of liquid milk in the Federal Republic of Germany in 1974 was studied by means of questionnaires involving 73 dairy plants responsible for about 67% of the total pasteurized milk output and about 80% of the total UHT milk output. The scope and presentation of this report were as in the 1973 report [see FSTA (1975) 7 3D82], and comparisons with 1969 and 1973 are tabulated. No marked differences between 1973 and 1974 were found for pasteurized milk packaging. The share of loose milk in total vol. of pasteurized milk fell to 21.5%. Sales of UHT milk increased further and they accounted in 1974 for about 28% of the total liquid milk market. The proportions of UHT milk in different containers were in 1974 (%): Tetrabrik 84.3, Pure Pak 8.1, Tetra Standard 4.6, Selfpak 1.0, and plastics bottle 2.0; the 1-l. carton size increased in popularity at the expense of the 0.5-l. (predominantly through switch from 0.5-l. Tetra Standard to 1-l. Tetrabrik). SKK

48

Environmental air in the aseptic processing of food.

Rocca, P. la; Rocca, R. la

Developments in Industrial Microbiology 16, 339-342 (1975) [6 ref. En] [La Rocca Lab., Inc., Dumont, New Jersey 07628, USA]

The importance of the degree and type of air-borne contamination in aseptic processing and packaging of food is discussed. Control methods include removal of particulate matter by filtration, electrostatic precipitation or scrubbing; filtration is most efficient. Laminar air-flow systems are capable of achieving Class 100 000 and Class 100 clean rooms (particle count ≤100 000 particles ≥0.5 μm/ft³ or <650 particles ≥5 μm/ft³, and particle count ≤100 particles ≥0.5 μm/ft³). Procedures are described for sampling and counting air-borne particulates and for enumeration of bacterial colonies in air. Samplings taken in several food processing establishments showed mean counts of 1-50/ft³ for Class 100, 20-150 for Class 10 000 and 150-380 viable particles/ft³ for Class 100 000 clean rooms. RM

49

Compak aseptic.

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 41 (11/12) 435-437 (1975) [En, Da, De]

The Compak aseptic machine for packaging milk under aseptic conditions consists essentially of a hydrogen peroxide bath and a filling section. The strip of the packaging material passes through a bath of H₂O₂, the surplus chemical is blown off by air blast, the strip is folded and made into a tube, filled with milk and shaped into rectangular packages. Finally, the individual packages are cut off along lines of pre-punched grooves and leave the machine. The packages are completely filled

with milk and do not contain any air. Aseptic conditions in the machine are maintained by sterile air at a pressure slightly above atmospheric. FL

50

The aseptically operating form-, fill- and seal machine TFA 240 from Höfliger & Karg.

Anon.

Nordeuropaeisk Mejeri-Tidsskrift 41 (11/12) 437-440 (1975) [En, Da, De]

In this machine the packaging is carried out on the form-fill-seal principle, the sterilization of both the packaging material and the lid being effected by H_2O_2 . The forming of individual cups, filling with the product and sealing take place in an enclosed 'sterile' tunnel, held under positive air pressure. The cleaning of product pipelines, filling units and nozzles is by the in-place method followed by sterilization with steam, according to a pre-set programme. The first prototype, was installed in 1973 in a Swiss dairy plant for the production of UHT coffee-cream in small plastics cups; very high degree of sterility is said to have been obtained. Further machines have been manufactured since. FL

51

Effect of psychrotrophic bacteria from raw milk on milk proteins and stability of milk proteins to ultrahigh temperature treatment.

Adams, D. M.; Barach, J. T.; Speck, M. L.

Journal of Dairy Science 59 (5) 823-827 (1976) [10 ref. En] [Dep. of Food Sci., North Carolina State Univ., Raleigh, N. Carolina 27607, USA]

10 Gram-negative psychrotrophs isolated from raw milk readily attacked raw milk proteins. κ - and β -casein were most susceptible although some of the isolates also attacked whey proteins. Detectable proteolysis did not require large psychrotroph populations. A 10-20% decrease in κ -casein during 2 days at 5°C accompanied growth of 1 isolate to a population of only 10 000/ml. Growth of psychrotrophs in raw milk predisposed the proteins to deleterious effects of UHT treatments by direct steam injection; there was little effect on raw milk caseins but α -lactalbumin and β -lactoglobulin were decreased by 21% and 34%, respectively. Milk that had undergone proteolysis exhibited decreased detectable κ -, β -, and α -caseins and increased loss of β -lactoglobulin as a result of UHT treatment, and milk suffering extensive κ -casein degradation, coagulated. Coagulation during or shortly after heating increased with severity of heat treatment and size of psychrotroph population. AS

52

Ultrahigh temperature pasteurization increases starter activity.

Stone, W. K.; Large, P. M.; Thomas, W. C.

Cultured Dairy Products Journal 10 (4) 11-12 (1975) [7 ref. En] [Food Sci. & Tech. Dep., Virginia Polytech. Inst. & State Univ., Blacksburg 24061, Virginia, USA]

Raw skim-milk standardized to 11.4% TS was subjected to UHT treatment at temp. ranging from

240° to 315°F for 0.02 s. Control samples were prepared by vat pasteurization of fortified cheesemilk at equivalent heat treatments of 153.3° to 161.2°F for 30 min; the % whey protein denaturation in each case ranged from 15.1 to 42%. Curd prepared from UHT-treated milk had similar flavour, body and texture ratings to those of control curd; however, rate of acid development was faster ($P < 0.05$) in the UHT milk curd, and the average time saved was 26.7 min. CDP

53

[HTST sterilization of solid foods. Experimental work at SIK during the period 1971-1974.]

Ohlsson, T.

SIK Rapport No. 379, 40pp. (1975) [18 ref. Sv, en] [Swedish Inst. for Food Preservation Res. (SIK), Fack, S-400 21 Göteborg 16, Sweden]

A summary is given of a series of studies on effects of HTST sterilization on the organoleptic properties of foods. Preliminary experiments with meat, vegetables and fish in very thin (4 mm deep) cans suggested that HTST sterilization may improve retention of organoleptic properties. In a second study, effects of HTST sterilization on the organoleptic properties of peas, comminuted fish pudding, precooked beef and cod fillet in 25 mm-thick cans or flexible packs were studied. The results show that HTST sterilization clearly improved the organoleptic properties and yield of peas and fish pudding, but only slightly improved the quality and yield of cod or precooked beef. Changes in the quality of HTST-sterilized foods during storage are also considered. AJDW

54

Sterilization by the use of intensive ultraviolet radiation.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 42 (2) 60-67 (1976) [En, Da, De]

The new Brown Boveri UV-C lamp is claimed to be 100 times stronger than earlier conventional lamps. Reference is made to experiments on the effects of UV irradiation with this lamp in which 3-5 s exposures are said to have destroyed completely all vegetative cells and spores and largely moulds. The lamp are suitable for sterilizing flat surfaces of packaging materials, pre-fabricated cups, and packaging material in form-fill-seal packaging machines, as well as for air sterilization in rooms where milk products are handled, e.g. cheese stores and packaging rooms, and laboratories. FL

55

Machine for aseptic packaging of milk in sachets.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 42 (2) 36-40 (1976) [En, Da, De]

An illustrated description is given of the 'Prepac IS.4 aseptic' machine for packaging milk into plastics sachets of 1, 0.5, 0.25 and 1/8 l., formed from rolls of 2 laminated strips with O_2 barriers. All moving parts that come into contact with the sterile milk and packaging material are enclosed in a cabinet. The initial sterilization is by

formaldehyde followed by atomizing H_2O_2 in the cabinet, whilst the packaging material is sterilized by passage through an H_2O_2 bath and irradiation with UV lamps. The cabinet is kept sterile by filtered air maintained at a pressure above atmospheric. At the end of the run the cleaning of the supply pipe is started automatically, the process being concluded with sterilization by steam. The machine is available with 1 or 2 filling heads in capacities of 2000 and 4000 units/h. FL

56

[Catalase test for detection of psychrotrophic organisms in UHT-treated milk.]

Matsumoto, M.; Zinbo, K.; Haruta, M.

Annual Report of Tokyo Metropolitan Research Laboratory of Public Health 23, 161-168 (1971, publ. 1972) [14 ref. Ja, en] [Dep. of Food Hygiene and Nutr., Tokyo Metropolitan Res. Lab. of Public Health, Tokyo, Japan]

Psychrotrophic organisms are mostly catalase-positive and there is a quantitative relationship between catalase activity and the number of psychrotrophs present; hence catalase activity can be used as an indicator of psychrotroph contamination of UHT-treated milk. 2 ml of a 0.03% solution of H_2O_2 were added to the UHT-treated milk sample and allowed to stand at 25°C for 2 h (or 24 h for detection of small numbers of psychrotrophs). 2 ml of 70% trichloroacetic acid was then added followed by filtration and detn. of the % of H_2O_2 degraded (a measure of catalase activity). When psychrotrophs were presented in the order of 10^5 /ml UHT-treated milk, H_2O_2 began to be decomposed by the catalase produced. The relationships between milk quality and growth of *Pseudomonas fluorescens* in sterilized milk at 5° and 10°C are also tabulated. [From En summ. and tables.] LMB

57

[Oxygen in milk.] Sauerstoff in der Milch. Lechner, E.

Deutsche Milchwirtschaft 27 (14, Beil. Lebensmittel-Labor 4) II-IV (1976) [2 ref. De] [Südd. Versuchs- & Forschungsanstalt für Milchwirtschaft, Weihenstephan, Federal Republic of Germany]

The influence was studied of preparation and packaging of UHT-treated milk on the changes which occur in dissolved oxygen and ascorbic acid contents during 6-wk storage. Degassing of the heated milk and provision of air-tight packaging were the chief factors favouring survival of ascorbic acid. Thus, no significant loss of ascorbic acid was observed in a degassed, imperviously packaged sample; complete loss occurred in 38 days in a degassed less imperviously packaged sample (the dissolved oxygen content of which meanwhile rose from 0.32 to 2.05 mg/l.); complete loss of the acid occurred in 13 days in a non-degassed sample containing initially 7.33 mg oxygen/l. 'Air-free' filling during packaging had little effect on loss of ascorbic acid. GTP

58

[UHT milk consumption increased considerably in 1975.] H-Milch Konsum in Europa auch 1975 beachtlich gestiegen.

Anon.

Deutsche Molkerei-Zeitung 97 (18) 529-530, 532-534 (1976) [De]

Data are given in tabulator and diagrammatical form on the consumption of UHT milk in each of 8 European countries in 1975, as proportions of all packaged liquid milk, as well as separately for 1970-1975 for Italy, Federal Republic of Germany, Switzerland and France. These show that the share of UHT milk in the total (packaged) liquid milk market has been increasing rapidly, and was particularly high (in 1975) in Italy (45%), Federal Republic of Germany (38%) and Switzerland (35%). Advantages claimed for UHT milk are enumerated. FL

59

[Trends in food processing.]

Entwicklungstendenzen der Lebensmittelverarbeitung. Reuter, H.

Molkerei-Zeitung Welt der Milch 30 (25) 721-732 (1976) [17 ref. De] [Inst. für Verfahrenstech., Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

The article deals mainly with general aspects of food processing, processing methods (development of industrial techniques, preservation by heating, freezing etc., packaging and storage), finished food products (UHT milk, recombined milk products, convenience and dietetic foods and imitation products) and raw materials. FL

60

[A new generation of UHT milk packaging machines.] Eine neue Generation der H-Milch-Füller.

Anon.

Molkerei-Zeitung Welt der Milch 30 (25) 733-735 (1976) [De]

The new combibloc aseptic packaging machine (PKL Paper- und Kunststoff-Werke Linnich GmbH, Düsseldorf) uses pre-fabricated blanks sterilized by a combination of a chemical (H_2O_2) and heat. The capacity of a 2-track machine is about 5160 packs/h (0.5 or one 1. in size) with 1 operator. The packages (plastics/Al foil/paper) are of rectangular shape, easy to open and empty stable and easy to stack. The change-over from one size to the other takes only 2-3 min and without interference with the aseptic operation. The machine is suitable for packaging liquid non-foaming products, such as milk and fruit juices. FL

61

[Studies of the quality of UHT milk in the Federal Republic of Germany.] Untersuchungen zum Qualitätsstatus der H-Milch in der Bundesrepublik Deutschland.

Renner, E.; Kess, U.; Lübben, A.

Deutsche Milchwirtschaft 27 (18) 523, 526-529 (1976) [7 ref. De] [Milchwirtschaftliche Abteilung der Justus-Liebig-Univ., Giessen, Federal Republic of Germany]

A survey of UHT milk in 36 centres showed it to vary considerably in flavour and ascorbic acid content, determined after 1 and 2 wk storage at room temp. Flavour varied from that of pasteurized milk (12% of samples) to that of sterilized; ascorbic acid content ranged from 1.1 to 19.5 mg/l. Flavour was best and ascorbic acid highest where heating conditions (either direct heating or indirect heating combined with degassing) favoured elimination of contained air. Quality was usually somewhat better in low-fat than in higher-fat samples but was not greatly affected by the intensity of the heat treatment applied. Production methods are available that can raise the present very variable quality of UHT milk to a satisfactory high level. GTP

62

The UHT-milk and the future. [Lecture] Hansen, R.

Nordeuropæisk Mejeri-Tidsskrift 42 (2) 49-59 (1976) [En, Da, De]

In this paper presented at a seminar on production, packaging, storing and distribution of UHT milk, held in Chile in March 1976, the author deals with various aspects of UHT milk production, including the capacity of UHT plants, use of recombined milk, organization of the storage of UHT milk particularly with a view to overcoming seasonal variations in milk production, handling of packaging materials to minimize contamination with bacteria at the plants producing UHT milk, and elimination of lactose from UHT milk with lactase for populations with lactose intolerance. FL

63

[UHT products - the present situation and future technological developments.] [Lecture]

Bogh-Sorensen, T.

Mælkeritidende 89 (20) 475-476, 478-479, 481-482, 484, 486, 488-489; (21) 505-506, 508-510 (1976) [Da] [A/S Paasch & Silkeborg Maskinfabrikker, Denmark]

This paper was presented at a meeting of the Danish Dairying Society on UHT products. After giving details of the temp./time curves, chemical changes and vitamin losses associated with different methods of heat treatment (low and high temp. pasteurization, UHT, sterilization) the author describes the various types of UHT plant, viz. steam-into-milk, milk-into-steam, plate heat

exchanger, tube heat exchanger and scraped surface. The merits of direct vs. indirect heating are examined, with reference to the aggregate heating effect of time and temp., organoleptic quality, ascorbic acid content, etc. The final part of the paper deals with aseptic packaging, keeping quality, and probable future developments in UHT technology. It is predicted that the emphasis will be on improvement of existing types of UHT plant rather than on development of completely new methods (e.g. direct heating with electricity and microwaves). ADL

64

[Marketing situation of UHT milk in Europe.] Die Marktsituation von H-Milch in Europa. Anon.

Deutsche Milchwirtschaft 27 (27) 850-852 (1976) [De]

Trends in the production of UHT milk in a number of European countries are given diagrammatically for 1971-1975. Factors that were involved in the rapid expansion of UHT milk production are discussed and information given briefly on the present position of UHT milk in the Federal Republic of Germany. FL

65

[Sterilization and additives in food preservation.]

La sterilizzazione e gli additivi nella conservazione degli alimenti. [Book]

Tateo, F.

165pp. (1974) [many ref. It] Pinerolo, Italy; Chiriotti Editori Price £5.50 [London, UK; Food Trade Press]

The role of sterilization and the additives as means for increasing the storage life of foods is discussed in detail in this book, which consists of the following chapters: Changing the composition of foods (pp. 5-7, Introduction); Heat sterilization of foods (pp. 9-23); Additives (definition, classification, regulation, toxicological tests) (pp. 25-37, 22 ref.); Regulations on chemical additives permitted in the preparation and for the preservation of foods (including a list of permitted additives, their application and max. doses, as well as a list of their characteristics and purity requirements) (pp. 39-84); Methods for the control of the purity requirements of preservatives (pp. 85-125); and Official methods for determination of some preservatives in vegetables and non-alcoholic beverages, and of pimaricin in cheese (pp. 127-149). A list of common foods and additives permitted for them is appended (pp. 151-156). HBr

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FAB 10

ASEPTIC PACKAGING

SELECTED FROM VOLUME 9

FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Institut für Dokumentationswesen, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen; Zentralstelle für maschinelle Dokumentation—Frankfurt am Main.

INTRODUCTION

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

ASSISTANT EDITOR

1

[First production experience with a new aseptic packaging system.] Erste marktgerechte Erfahrungen mit neuem aseptischem Füllsystem. Anon.

Deutsche Molkerei-Zeitung 97 (28) 847-848 (1976) [De]

A brief account is given of the use, at a Mannheim dairy, of a combibloc aseptic cF 5000 packaging machine with an hourly output of about 5160 milk packages of 1- or 0.5-l. vol. The machine uses prefabricated blanks and employs H_2O_2 as the sterilant. During an operation of 3 months the machine produced about 2 million milk packages. FL

2

[Technological improvements and sterilized milk characteristics.]

Corradini, C.

Scienza e Tecnica Lattiero-Casearia 26 (3) 155-169 (1975) [20 ref. It, en] [Istituto di Chimica Agraria, Univ. Cattolica del S. Cuore, Piacenza, Italy]

This review-type article on effects of UHT sterilization deals mainly with changes in colloidal protein compounds during sterilized milk storage, with particular reference to the author's studies of UHT sterilization in the Stematic Long Run plant [see FSTA (1975) 7 5P1111 & (1976) 8 2P222 & 2P278]. SKK

3

[Significance of the increase in psychrotrophic species of *Bacillus* in milk.] [Review]

Bottazzi, V.; Battistotti, B.

Scienza e Tecnica Lattiero-Casearia 26 (3) 192-196 (1975) [7 ref. It] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

In this review, the authors discuss the incidence of spore-forming bacteria (*Bacillus*, *Clostridium* and *Thermoactinomyces*) in milk, and the effect of temp. on their survival and development. Data from the literature show the effect of UHT treatment on numbers of *Bacillus* spores in milk. Of the 9 spp. tested, all except *B. coagulans* and *B. stearothermophilus* were completely destroyed at 120°C for 10 min; 100% destruction of these 2 resistant spp. was obtained at 130°C for 10 min. It has been shown that the quality of the UHT product may be adversely affected if the milk is exposed to extremely high temp. for long periods. Results have also demonstrated that certain forms of UHT treatment may actually stimulate germination of *Bacillus* spores. Implications of these results are discussed. MC

4

The size of the random sample in the quality control of production with a low level of defect.

Bockelmann, B. von

Nordeuropaeisk Mejeri-Tidsskrift 40 (8) 292-300 (1974) [En, Da, De] [Tetra Pak Int., Lund, Sweden]

It is shown that theoretically the statistical control of quality for a product with a low level of defect, e.g. bacterial contamination, depends upon sample size and not production quantity. The conditions influencing sample size are discussed with considerations being given mainly to the chosen defect level and estimation of the defect level in relationship to real circumstances. Examples are used to show that small defect numbers lead to biased binomial distributions and that Poisson distribution should be used. A recommended sampling method for function testing and quality control of UHT milk processing plants and Tetra Pak aseptic packaging machines is given. AP

5

[Technical UHT milk colloquium of the German Dairy Industry.] Technisches H-Milch Colloquium für die deutsche Molkereiwirtschaft. [Conference proceedings]

Tetra Pak International AB

69pp. (1975) [De] Lund, Sweden

The proceedings of the colloquium organized by Tetra Pak on 30 Oct. 1975 in Frankfurt-am-Main contain the following 3 papers: UHT processing - keeping quality - marketing, by R. Heiss (pp. 4-15, see FSTA (1976) 8 6P1042); Microbiological aspects of UHT-milk processing, by M. Busse (pp. 39-50, 8 ref.); and Nutritional evaluation of UHT milk, by E. Renner (pp. 51-67, 8 ref., see FSTA (1976) 8 6P1016). A further paper is abstracted separately [see following abstr.]. FL

6

[Technological position of UHT milk manufacture.]

(In 'Technische H-Milch Colloquium für die deutsche Molkereiwirtschaft'.) [Lecture]

Kessler, H. G.

pp. 16-38 (1975) [2 ref. De] Lund, Sweden

The author surveys various technological aspects of UHT milk production, covering effects of high-temp. treatment on the destruction of bacteria and spores, inactivation of enzymes, browning, etc. and equipment (UHT sterilizers and aseptic packaging machines, e.g. bottle-pack system, Benhill, combibloc aseptic, Zupack and Tetra Brik. [See also preceding abstr.]. FL

7

[Keeping quality of UHT milk.]

Nakanishi, T.; Yamagishi, A.; Sugawara, H.
Japanese Journal of Dairy and Food Science
[*Rakuno Kagaku Shokuhin no Kenkyu*] 25 (3)
A99-A102 (1976) [4 ref. Ja, en] [Lab. of Food,
Tohoku Social Welfare Univ., Sendai, Japan]

Milk samples were collected from 3 milk plants in Sendai immediately after UHT processing, and stored at 2° and 7°C. Standard plate count increased from <100 to 800-6000/ml after 10 days at 2°C and 5000-100 000/ml after 10 days at 7°C. During the same period of time, psychrophilic count increased from <10 to 12 000/ml at 2°C and 75 million/ml at 7°C at one plant, from 0 to 30 500/ml at both temp. at the 2nd plant, and from 0 to <10/ml at the 3rd plant. There was little change in bacterial counts during the 1st 6 days of storage. No marked changes occurred in values for pH, acidity, alcohol test, clot-on-boiling test, pure protein, non-protein N or free tyrosine during 10 days' storage at either temp. It is concluded that UHT-processed market milk may be stored for 10 days at 2°C or 7 days at 7°C. [From En summ.] CDP

8

[New microbiological and technological aspects of yoghurt production.] [Lecture]

Bottazzi, V.

Scienza e Tecnica Lattiero-Casearia 26 (6) 401-426 (1975) [14 ref. Fr, It] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

This review deals with microbiological aspects of yoghurt production, including proteolysis and the composition of polysaccharides secreted by *Lactobacillus bulgaricus*. It outlines the preparation of starter cultures for 3 strains of *Streptococcus thermophilus* and 2 strains of *L. bulgaricus*. 3 methods of production of yoghurt are described, including one involving fermentation at 42°C to pH 4, heating to 65°C, setting at 8-10°C for 15-20 h followed by stirring and aseptic packaging. JMD

9

[A new Brown Boveri development in UV sterilization.]

Anon.

Voedingsmiddelentechnologie 9 (14) 14-15 (1976) [Nl]

A new UV sterilization system using a special high-intensity Hg vapour discharge lamp UV source is described. Applications considered include sterilization of materials for aseptic packaging of foods, sterilization of bottles, etc., and sterilization of drinking water and other liquids. Even resistant organisms (e.g. *Aspergillus niger*) may be eliminated with an exposure time of 30-40 s. Advantages of UV sterilization are discussed, and the safety of the process is considered. AJDW

10

[New developments from PKL:combibloc-cF 5000 aseptic packaging machine.] Neue Entwicklung von PKL:Combibloc-Füller cF 5000 aseptisch.

Anon.

Oesterreichische Milchwirtschaft 31 (16) 299-302 (1976) [De]

11

Aseptic filling apparatus and method.

White, T. P. Nobel Scientific Industries Inc.

United States Patent 3 977 445 (1976) [En]

Containers with an open inlet at the upper end are filled with flowable sterile media while a sterile gas curtain surrounds the container to prevent contamination. IFT

12

The new Combibloc filling machine in operation.

Hansen, R.

Nordeuropaeisk Mejeri-Tidsskrift 42 (4) 123-126 (1976) [En, Da, De]

Information is given briefly on the PKL's new Combibloc aseptic machine which has been in operation under commercial conditions at the Milchzentrale Mannheim-Heidelberg, German Federal Republic since 27 Feb. 1976. Major results include: loss due to non-sterile packages 0.013% (determined by incubation at 20°C for 5 days); losses occurring during packing of packages into transport packs 0.007%; and leakages caused by the machine 0.03%. The capacity of the machine is 5100 packages/h, 100 000-110 000 packages being produced in 2 shifts. FL

13

Production of volatile flavor compounds in ultra-high-temperature processed milk during aseptic storage.

Jeon, I. J.; Thomas, E. L.; Reineccius, G. A.

Abstracts of Papers, American Chemical Society 172, AGFD 157 (1976) [En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

The UHT milk was processed at 145°C for 3 s with and without added ascorbic acid and stored at 3°, 22° and 35°C for 5 months. Flavour isolates were prepared through steam vacuum distillation and subsequent extraction of the distillate with dichloromethane, and analysed on a 3 m × 0.32 cm 10% Carbowax 20 M column coupled to a mass spectrometer. Acetone, 2-pentanone, 2-heptanone, 2-nonanone and n-hexanal contents increased during storage. Considerable increases were also observed with 2-octanone, 2-undecanone, 2-tridecanone, n-propanal, n-pentanal, n-heptanal, n-octanal and n-nonanal. The quantities of some of these compounds formed depended upon both O₂ content and temp. of storage. Alcohols such as 1-propanol, 1-butanol, 1-pentanol, 1-heptanol were

present but only 1-butanol showed an increase during storage. Other compounds such as diacetyl, 2-decanone, n-decanal, benzene, toluene, ethylbenzene, 2-furfural, benzaldehyde, 2-furfurol, methyl sulphide and methyl disulphide were present but did not increase during storage. AS

14

[Testing a sterile tank for use in UHT processing lines.] Prüfung eines Steriltanks für Ultrahocherhitzungsanlagen.

Reuter, H.

Molkerei-Zeitung Welt der Milch 30 (40) 1172-1173 (1976) [De]

Tests were carried out on a Sordi sterile tank made of chromium/nickel steel (overall height about 3400 mm, and external diam. 1870 mm) with a max. capacity of 50 000 l. during operation in a complete production line comprising also a Steriplak 30L UHT sterilizer and a Tetra Brik aseptic packaging machine. None of >900 packages collected on 3 separate occasions showed any defects when examined bacteriologically after 4 weeks of storage at room temp. It is concluded that the design of the tank permits its reliable use and intermediate storage of UHT milk under sterile conditions and no objections are made against its approval. FL

15

[German Agricultural Society's (DLG) testing of liquid milk in 1976.] DLG-Qualitätsprüfung für Konsummilch 1976.

Kynast, S.

Deutsche Milchwirtschaft 27 (43) 1545-1546 (1976) [De]

A total of 417 samples of market milk, including 19 'Vorzugsmilch', 304 pasteurized whole milk, 16 pasteurized low-fat milk (including 1 sample of skim-milk and 2 of protein-enriched milk) and 78 UHT milk (2 protein-enriched) was tested in Kiel in April 1976. The results, including flavour defects (5 samples), defective fat distribution (5 samples) and shortcomings in the dating (16 samples), are given briefly showing that 67.1% of the samples were given the highest award, 19.4% silver medal and 1.9% bronze medal. [See FSTA (1976) 8 7P1228 for 1975 results.] FL

16

Trends in high temperature sterilization of dairy products.

Woods, W. C.

Cultured Dairy Products Journal 11 (3) 8-11, 24 (1976) [5 ref. En] [DASI Ind. Inc., Silver Spring, Maryland 20910, USA]

This review-type article deals with UHT processing in the dairy industry, covering the nature and growth of the technique, the methods used, including the free-falling film DASI system, and the potentials for cultured products. FL

17

The European market for UHT milk.

Anon.

Food Trade Review 46 (5) 282 (1976) [En]

Tabulated data show the market share of UHT/aseptic milk in 1975 for France, Italy, Germany, Netherlands, Spain, Switzerland, Yugoslavia and Belgium. Data presented include: total sales of liquid milk from dairies; % and wt. of which is packaged; % and wt. of which is UHT milk; and % increase of UHT milk during 1975. VJG

18

Aseptic canning.

Green, J.

BNF Bulletin No. 18, 376-384 (1976) [6 ref. En] [H. J. Heinz Co. Ltd., Hayes Park, Hayes, Middx., UB4 8AL, UK]

The advantages of (i) aseptic canning over (ii) conventional canning are discussed, with mention of HTST sterilization of milk, enzyme inactivation, and nutritional and economic advantages. Experiments are reported showing that % retention of ascorbic acid content in tomato soup and of thiamin in chicken soup were much higher by (i) than (ii), and that Sn uptake from plain tinplate cans with Sn/Pb soldered side seams was markedly reduced when using (i), without the increased uptake of Pb that occurs in lacquered cans. Aseptic canning of tomato paste is also mentioned. AL

19

Processor and apparatus for filling containers with liquid.

Beaurain, F.

British Patent 1 448 492 (1976) [En]

This invention relates to a method and equipment for producing sealed packages of liquid products, or liquid-based products without the inclusion of air, e.g., milk, soft drinks, or solid products to be conserved in a juice or sauce, such as the usual vegetable or fish preserves. The package is so designed that the contents will not spill when the container is opened, because on detaching the cover the concave walls of the package expand, thus increasing the package vol. and causing the product level to fall. It is claimed that the process may be used for sterile packaging. FL

20

[UHT milk and its packaging.]

Fremont, Y.

RTIA [Revue Technique et Economique de l'Industrie Alimentaire] 23 (243) 41, 43, 44, 47, 49, 51 (1976) [Fr]

The author surveys aseptic packaging, covering the materials (glass, metal, paper and plastics), problems of the protection of milk against light, and different methods of aseptic packaging (in glass, plastics and metal containers, and cartons). FL

21

[New developments in the manufacture of infant feed formulae.]

Cerna, M.

Prumysl Potravin 27 (8) 449-450 (1976) [Cs]

[Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Information is given on Uperised aseptically packaged infant milk formulae produced in Finland (Tutelli), German Federal Republic (Humana, Pre-Aptamil) and Switzerland (Galactina, Nan), covering generally packaging, size of containers, and composition. A recipe for the preparation of adapted milk with 13.6% TS, based on demineralized whey (74%) and cream (24.7%) with added lactalbumin, maltose preparation, sunflower oil, barley flour and vitamins + Fe is given. The product is Uperised, and packaged aseptically.

FL

22

[Physico-chemical defects of sterilized milk.]

Tylkin, V. B.; Tsaberyabaya, N. I.

Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 1, 63-65 (1976) [5 ref. Ru] [Donetskii Inst. Sovetskoi Torgovli, USSR]

Apart from microbiological defects, chemico-physical defects were found in samples of aseptically-packaged UHT milk. Immediately after processing the milk was waters and contained sediments; it had a cream-like colour and pasteurized odour. During storage, separation of fat was observed as well as precipitation of proteins and development of oxidized flavour. The stability of the fat phase in stored sterilized milk depended on the homogenization; the stability of the protein colloidal phase was affected by the thermostability of the milk. STI

23

[Market analysis of different package types for pasteurized and UHT milk in the German Federal Republic in 1975.] Marktanalyse der verschiedenen Verpackungsarten von pasteurisierter und ultrahocherhitzter Konsummilch in der Bundesrepublik Deutschland 1975.

Longuet, D.

Deutsche Molkerei-Zeitung 97 (42) 1356-1358, 1361-1362 (1976) [De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

This survey of the market shares and development of different types of packaging for pasteurized and UHT milk (glass bottles, plastics bottles, sachets, Tetrabrik, Tetra Standard, Pure-Pak, etc.) is based on replies to questionnaires received in 1975 from 73 enterprises producing pasteurized milk and 31 producing UHT milk. The

results for 1975 are compared with results of similar surveys in 1969, 1972 and 1974. They are also analysed by regions. In the case of pasteurized milk, cartons had a market share of 61.1% in 1975, followed by plastics packs (36.4%). In the case of UHT milk, Tetrabrik had a market share of 88.6%. [See also FSTA (1975) 7 3D82.] ADL

24

[Use of aluminium packaging in the dairy industry.] [Lecture]

Poulsen, P. R.

Nordisk Mejeriindustri 3 (11) 431, 433-436 (1976) [Da] [Statens Forsogsmejeri, Hillerød, Denmark]

This paper discusses the use of Al packaging for dairy products, divided into 5 broad groups: milk and cream; cultured milk products; cheeses; butter and similar products; dried milk and other preserved products. The special advantages of Al are stressed (impervious to gas and light, easy to shape and fold, etc.). The superiority of Al foil over parchment for protecting the organoleptic quality of retail-packaged butter is demonstrated by tabulated experimental results. Experimental data are also given to show how inclusion of Al foil (together with polyethylene film) inside wax-treated cartons of UHT milk prevented loss of ascorbic acid during 5 weeks' storage at 5, 22 or 37°C, whereas in similar cartons without Al foil the ascorbic acid content of the milk fell from 18 to 3 mg/l. Some instances where use of gas-impervious Al packaging creates problems are pointed out, viz. cultured milk products and cheeses in which gases such as CO₂ are formed during ripening. The need for further research to solve such problems is stressed. ADL

25

Milk and Dairies (Milk Bottle Caps) (Colour) Regulations 1976.

United Kingdom, Minister of Agriculture, Fisheries & Food; United Kingdom, Secretary of State for Social Services

Statutory Instruments No. 2186, 3pp. ISBN 0-11-062186-7 (1976) [En] London, UK; H.M. Stationery Office Price £0.15

These regulations, which apply to England and Wales only, re-enact with amendments the 1973 regulations on the same subject. They prescribe the colours of caps and lettering to be used in labelling bottled milk, including sterilized milk (black/silver lettering and blue cap) and UHT milk (black/silver lettering and pink cap). ADL

26

[Method for aseptically packaging water-containing products, and packaging material used.]

Unilever NV

Netherlands Patent Application 7 603 888 (1976) [Nl]

A container for cooked and/or baked products, particularly pre-baked bread, consists preferably of a base and lid which are deep-drawn from a plastics film laminate, e.g. of polyolefine plus polyester or polyamide. The base and lid are heat-sealed along their rim flanges after the dough has been placed into the container. To prevent the forming of a partial vacuum during cooking with subsequent collapse of the container during cooling, part of the welded rim is provided with small channels which act as mini-valves during the cooking or baking process, the channels being formed e.g. by inserting steel pins to form spaces during heat-sealing. The valves may be hermetically sealed after the main cooking process, with subsequent heating to pasteurizing temp. for a suitable period of time. Pre-baked bread packaged in this manner has a long shelf life, e.g. 6 months at 15°C, without any deterioration in its quality, and is ready for consumption after short baking to produce a brown crust. W&Co

27

Use of nuclear energy to preserve man's food.

[Lecture]

Zeeuw, D. de

International Atomic Energy Agency Bulletin 18 (supplement) 7-12 (1976) [En] [Min. of Agric. & Fisheries, Hague, Netherlands]

Quantitative and qualitative food losses are estimated at 20-40% in developing countries, or even 60-70% in humid tropics. Irradiation is claimed to extend the storage life of food considerably without noticeable changes in its characteristics, leave no chemical residues (e.g. of ethylene oxide, sulphites), eliminate pathogens (e.g. salmonellae), is an easy, reliable and low energy process, and intensive tests have shown it to be completely safe. The energy requirement (kWh/t) for radiation pasteurization is 0.76, for radiation sterilization 6.3, but freezing requires 90, heat pasteurization 230, heat sterilization 300 and drying 700; thus energy savings of 70-97% are possible using irradiation. Development work with a pilot plant in the Netherlands is described, including: frozen meals, mushrooms, potatoes (sprout inhibition), fresh chickens (shelf life increased 2-4 ×, salmonellae eliminated), fresh fish fillets (shelf life increased 2-3 ×), onions, and in Indonesia the elimination of losses of stored rice by insect infestation (20% even with fumigation). AL

28

[Measurement of the colour of milk and dairy products by means of reflectance.]

Vujicic, I.; Hasan, A. I.; Vujicic, V.

Mljekarstvo 26 (10) 227-232 (1976) [5 ref. Sh, en] [Poljoprivredni Fak., Novi Sad, Yugoslavia]

See FSTA (1976) 8 11P2179.

29

[Use of a spectrophotometer in the turbidity tests for heat treatment of milk.]

Leali, L.

Atti della Societa Italiana delle Scienze Veterinarie 29, 603-606 (1975) [10 ref. It, fr, en] [Istituto di Ispezione degli Alimenti e Centrale del Latte di Milano, Milan, Italy]

The Aschaffenburg test [Journal of the Society of Dairy Technology (1950) 3 (4) 236-237] was modified to include homogenization of the serum, dilution 1:100, and estimation of the turbidity with a spectrophotometer. Readings were made at 278 and 500 nm on sera from 387 samples of milk. Mean and SD extinction values at 500 nm are tabulated; 95% confidence limits are 0.35-0.43 for raw milk, 0.20-0.28 for milk pasteurized at 95°C, 0.13-0.22 for Uperised milk using direct UHT heat treatment, 0.01-0.12 for UHT-sterilized milk using indirect UHT heat treatment, and 0.02-0.07 for in-bottle sterilized milk. JMD

30

Gelation of ultra-high-temperature-sterilized milk by proteases from a strain of *Pseudomonas fluorescens* isolated from raw milk.

Law, B. A.; Andrews, A. T.; Sharpe, M. E.

Journal of Dairy Research 44 (1) 145-148 (1977)

[13 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, RG2 9AT, UK]

Cooled raw milk was inoculated with approx. 5×10^4 colony forming units (cfu) of *P. fluorescens* AR11/ml. Controls were left uninoculated. The samples were then either homogenized and immediately sterilized by heating at 140°C for 3.5 s or stored at 7.5°C for 1, 2 or 3 days before being processed in the same way. Milk sterilized immediately contained no viable bacteria whereas those samples held for 1, 2 and 3 days contained *P. fluorescens* AR11 at 8×10^5 , 8×10^6 and 5×10^7 cfu/ml respectively. UHT-sterilized milk samples in which AR11 had grown to 5×10^7 and 8×10^6 cfu/ml before sterilization gelled, as a result of protease activity, after 10-14 days and 8-10 wk respectively at 20°C. Uninoculated controls and milks which contained $< 8 \times 10^6$ cfu of AR11/ml remained liquid for the full period of the experiment (20 wk). The numbers of bacteria used in this study were within the range found in stored commercial milk samples. The protease caused extensive protein breakdown of κ -casein to para- κ -casein in a way similar to rennet action. β -casein was also broken down rapidly while α_{s1} -casein was degraded only slowly. LMB

31

Infra-red sterilization of glass packages for aseptic processing. [Lecture]

Molin, G.

Proceedings of the European Meeting of Meat Research Workers No. 22, J8:1-J8:7 (1976) [24 ref. En, fr, de, ru] [Swedish Meat Res. Cent., Kävlinge, Sweden]

A pilot plant equipment for continuous dry-heat sterilization of glass containers for meat products etc. was constructed and tested. Containers were heated along a conveyor belt by short-wave (IR) radiation to a temp. of about 250°C, and were then

cooled by sterile-filtered air to a temp. of 70-120°C. The input power of the heating stage was 36 kW. Glass bottles with a vol. of 500 ml and wt. of 250 g and 360 g, respectively, were infected on the inside with about 5×10^7 *Bacillus subtilis* var. *niger* spores/bottle, heat treated and tested for sterility. The light bottles were found to be sterile after a heating time of 70 s followed by a cooling time of 290 s. The heavy bottles were sterilized after 80 s of heating and 340 s of cooling. The sterilizing capacity of the pilot plant was 490 light bottles or 430 heavy bottles/h. The results indicate that the technical obstacles for continuous IR-sterilization of glass containers for aseptic processing can be controlled, and that the sterilization technique can be used for industrial in-line sterilization. [See FSTA (1977) 9 6S988.] AS

32

[Effect of packaging on the quality of UHT milk.]
Luquet, F. M.; Goussault, B.; Gouerec, J.; Gagnepain, M. F.

Revue Laitière Française No. 351, 141-148 (1977) [10 ref. Fr] [Inst. Sci. d'Hygiène Alimentaire, 75005 Paris, France]

In experiment 1, UHT milk (enriched with ascorbic acid) was packaged in 1-l. polyethylene-Al foil laminate cartons (i) in the absence of air and (ii) in the presence of about 60 ml air. In experiment 2, UHT milk (not enriched with ascorbic acid) was packaged in (i) and (ii), and in (iii) clear plastics bottles heat-sealed and including an air space, (iv) in plastics bottles capped with polyethylene-Al foil laminate and heat sealed with an air space, and (v) in yellow plastics bottles with an air space. The contents of ascorbic acid, riboflavin and folic acid were measured after storage for up to 90 days at 20°C (with or without agitation) in experiment 1, and at ambient temp. in the presence or absence of light for up to 4 months in experiment 2. The effects of direct or indirect UHT sterilization were also studied. In experiment 1 the raw milk contained 7.24 mg ascorbic acid/100 ml; after direct UHT treatment and in the absence of air, the ascorbic acid content was 4.7-4.95 mg/100 ml after 90 days (vs. traces and 2.2-2.45 mg/100 ml for indirect UHT-treated milk stored in the presence and absence of air respectively). In organoleptic tests, milk stored in (i) was preferred. In experiment 2, milk stored for 1 month contained 0.20 ± 0.06 mg ascorbic acid/100 ml and 0.17-0.24 mg folic acid/100 ml; the contents of these vitamins depended more on the heat treatment of the milk than on the subsequent storage conditions. Riboflavin was completely destroyed by exposure to light for 1 month in packages (iii) or (iv), partially destroyed in (v) and protected in (i) and (ii) or when stored in darkness. Odour defects developed in milk exposed to light in clear plastics bottles. MEG

33

New developments in UHT sterilized milk.

Swaigood, H. E.

Dairy and Ice Cream Field 160 (1) 48, 50, 60 (1977) [10 ref. En] [N. Carolina State Univ., Raleigh, N. Carolina, USA]

Types of equipment and flavour defects are reviewed, including the removal of cooked flavour with bound sulphhydryl oxidase. JMD

34

UHT treatment of milk-based products.

Ashton, T. R.

Annual Bulletin, International Dairy Federation No. 89, 20pp. (1976) [En, Fr]

In this paper, produced in close consultation with the IDF Group of Experts on UHT Treatment and Aseptic Packaging of Milk and Milk Products, the ranges of milk-based UHT products currently available in Europe and in the USA are listed. Types of milk-based products that could be produced on a commercial scale are grouped into 4 categories based on homogeneity and whether liquid or semi-solid/jellified. UHT/aseptic packaging systems are compared with conventional sterilization. Principles of formulation and steps that might be taken to launch a UHT project are outlined, and some notes on systems of UHT treatment and aseptic packaging (including type of treatment plant, time/temp. of treatment, aseptic blending facilities, and type of filler) are presented. CDP

35

[Is a further change-over to UHT milk on the German milk market desirable and how can it be influenced?] Ist eine weitergehende Umstellung des deutschen Konsummilchmarktes auf H-Milch wünschenswert und wodurch lässt sie sich beeinflussen?

Drews, M.

Molkerei-Zeitung Welt der Milch 31 (9) 265-274, 276 (1977) [15 ref. De] [Inst. für Betriebswirtschaft & Marktforschung, Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

After examining the reasons for the increasing popularity of UHT milk in the Federal Republic of Germany (where its market share increased from 3.3% in 1970 to 35.8% in 1976, at the expense of pasteurized milk) the author discusses what market shares are desirable for the 2 types of milk and analyses the following possibilities for ensuring that pasteurized milk retains a high share of the market: (i) making available a cheaper type of pasteurized milk, relative to UHT milk; (ii) use of accurate accounting methods to calculate the min. price at which UHT milk should be sold by dairies to retailers who demand special low concessionary prices (thus exploiting the dairies' need to achieve max. utilization of UHT treatment capacity, greatly

expanded in recent years); and (iii) avoidance of ill-judged investments in UHT installations, by careful consideration of practical alternatives. The various possibilities are illustrated by detailed examples. It is considered that the optimum market shares for UHT milk and pasteurized milk are those that would result if the price ratio between the 2 products roughly corresponded to the cost ratio, i.e. if both products were subject to similar competitive conditions. ADL

36

[Tests on Compak aseptic packaging machine for UHT milk; manufacturer Hesser Maschinenfabrik AG - Bosch Gruppe, Stuttgart-Bad Cannstadt, Federal Republic of Germany.] Prüfung der Abpackmaschine Compak aseptic Typ HCP 31a zur Abpackung ultrahocherhitzter Milch. Hersteller: Hesser Maschinenfabrik AG - Bosch-Gruppe, Stuttgart-Bad Cannstadt, Federal Republic of Germany. Kessler, H.

Molkerei-Zeitung Welt der Milch 31 (7) 211-213 (1977) [De] [Prüfstelle für Milchwirtschaftliche Maschinen, Apparate & Anlagen, Südd. Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

This abridged version of the test report of 20 Sept. 1976 gives details of the Compak aseptic packaging machine, type HCP 31a, with an hourly output of 2160 one-l. containers (plastics/carton/Al laminate). The machine supplied from a Stork UHT plant was found to be easy to operate, maintain and control and suitably constructed to allow the operation under sterile conditions. Cleaning and sterilization could be performed satisfactorily, and the control and safety devices worked effectively. In bacteriological tests the presence of bacteria was not detected after 6-wk storage at room temp., the milk was found to be free of H_2O_2 by the 'Perid test' and only 1 sample of >900 was found curdled after 6-wk storage. No objections are made to the approval of the machine for the packaging of UHT milk. FL

37

[Organoleptic changes in UHT milk during storage.] Sensorische Veränderungen von H-Milch während der Lagerung.

Renner, E.

Deutsche Milchwirtschaft 28 (8) 231-234 (1977) [9 ref. De] [Milchwirtschaftliche Abteilung, Justus-Liebig-Univ., Giessen, Federal Republic of Germany]

The author discusses on the basis of literature data the different changes occurring during storage in the taste of UHT milk and their underlying causes. It is concluded that UHT milk correctly produced by the direct method shows, irrespective of fat content (1.5 or 3.5%), no perceptible taste changes during storage at room temp. for ≤ 6 wk; whereas UHT milk with 3.5% fat produced by the indirect method shows appreciable changes under these conditions, reduction of fat content to 1.5% leading to marked improvement. SKK

38

[Hygienic aspects of sterilization, with reference to basic principles, methods, and control.]

Grundlagen, Durchführung und Kontrolle der Sterilisation aus der Sicht der Hygiene.

Horn, H.; Machmerth, R.

Lebensmittel-Industrie 24 (1) 15-19 (1977) [28 ref. De, en, ru] [Med. Akad. Erfurt, Inst. für Allgemeine Hygiene, German Democratic Republic]

Sterilization in the food industry is discussed, with reference to: required characteristics of sterilization processes; time/temp. conditions needed for elimination of various microorganisms; the advantages and disadvantages of various sterilization procedures (irradiation, ethylene oxide treatment, hot-air or steam sterilization); and methods for testing the efficacy of sterilization. IN

39

A study of the effects of processing and storage on selected components of sterilized liquid infant formulas.

Mulchandani, R. D.

Dissertation Abstracts International, B 37 (5) 2143-2144:Order No. 76-24659 (1976) [En] [Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

Stage of processing, presence or absence of UHT-short time heat treatment or type of milk used had no significant effect on the distribution of minerals, citrate and N contents of fresh infant formulas; differences in hydroxymethylfurfural were not significant. After 6 months storage, the Ca and N contents of the fluid portion of the UHT-short time processed samples containing low heat milks were significantly lower than those of the corresponding fresh samples. Storage or UHT-short time treatment had no effect on Mg, citrate and P distribution. Electrophoretically the most significant difference between products containing different milks was in the amount of undenatured whey proteins present at the start of processing; following sterilization the patterns of the various samples were similar. UHT-short time treatment partially denatured the whey proteins while retort sterilization affected whey proteins and caseins. Significant amounts of sediment were formed in the UHT-short time processed products containing low heat milks but not in the others; the sediment contained α_s - and β -casein, α -lactalbumin and β -lactoglobulin. Undenatured whey proteins in low heat products and UHT-short time treatment triggered the formation of large-sized aggregates which sedimented in the sterilized product during storage. DMK

40

[Technological principles of manufacture and properties of UHT milk.]

Görner, F.

Prumysl Potravin 27 (10) 567-571 (1976) [Sk] [Slovenska Vysoka Skola Tech., Chemickotech.]

Fak., Bratislava, Czechoslovakia]

A brief description is given of a UHT processing line, comprising an Alfa-Laval VTIS-C sterilizer (4100 l./h capacity) and an aseptic packaging machine (3700 l./h). The process involves preheating milk to 75°C, heating by steam injection to 140°C, holding for 3-4 s, evaporative cooling to 76°C, homogenization, and cooling to about 20°C. The milk is then fed into a sterile tank and from there to the packaging machine. FL

41

What it takes to be an aseptic pioneer:
Slater, L. E.

Food Engineering International 1 (11) 34-38 (1976) [En]

At La Parmalat SpA food at Parma, Italy, 1000 t milk/day are converted into 25 long shelf-life products. The milk is treated in a Rossi & Catelli (Parma, Italy) UHT-processing system with a capacity of 16 000 l./h and capable of running continuously for 40 h without cleaning. For packaging of the products there are 23 Tetra Pak machines, and 2 horizontal systems (Plastomechanique and Hamba) for filling UHT-processed puddings and yoghurt respectively into plastics cups. There is a rigorous quality control system with routine packaged samples being taken from each packaging line every 6 min and the whole production run held in the warehouse at ambient temp. until quality tests are completed (≥ 6 days). Reasons for the marked growth of the UHT/aseptic product market in Italy are discussed. CDP

42

What's new in packaging?
Anon.

Food Processing Industry 46 (544) 52, 59, 62 (1977) [En]

Consideration is given to the latest developments in the application of systems and materials to the packaging of food and drink: aseptic packaging and foil alternatives; baby food sealing problem solved; 'bag-in-box' for bulk milk; new coffee jar; tops for drinks bottles; and push-in top for cans. VJG

43

Aseptic carton filling.

AB Akerlund & Rausing

British Patent 1 461 050 (1977) [En]

Process for aseptic filling of foodstuffs employs pressurized steam to exclude oxygen from the filling process. Potatoes, root vegetables, meat and prepared foods are cited as potential applications. IFT

44

The quality of concentrated skim milk sterilized at ultra-high temperatures.

Whitney, R. McL.; Reddy, G. V.; Lin, J. V.; Tyner, S. J

Dairy and Ice Cream Field 160 (4) 70, 72 (1977) [En] [Univ. of Illinois, Coll. of Agric., Urbana-Champaign, Illinois 61809, USA]

Skim-milk was concentrated to 38% TS, sterilized at 155°C without holding, canned aseptically and stored at 37.7°, 23.3° and 4.5°C. During sterilization the number and size of the micelles greatly increased and inorganic phosphate shifted from the serum to the micelles, suggesting that calcium phosphate bridges were formed between the micelles. During the first 5 days of storage, regardless of temp., the number and mean vol. of the micelles decreased, but on further storage, the micelles formed chains, their onset and extent varying with the temp.. The reaction finally resulted in gelation after 20 days at 37.7°C and after 60 days at 23.3°C; the product however remained liquid at 4.5°C. Non-protein N content increased sharply during the first 5 days, due possibly to the action of a protease (either not inactivated by heating or reactivated on storage). Ca and Mg ions moved from the serum to the micelles during storage at a rate depending on temp. (high at high temp. and vice versa). The direction of the movement of citrate and inorganic phosphate varied with temp. (from the serum at 37.7°C and to the serum at 4.5°C). It is considered that the new protein surface formed by the protease provides new binding sites for Ca and Mg on the micelles and then, as phosphate and citrate move into the micelles, bridges could be formed resulting in chain formation and gelation. FL

45

[Method for packaging processed cheese.]

Vonk's Kaasmaatschappij BV

Netherlands Patent Application 7 503 943 (1976) [Nl]

To carry out sterilization of processed cheese before packaging without discoloration of the product, the cheese is heated to 125°C for a short period of time, cooled to 80-85°C, poured into a liquid bath, preferably brine at 10-20°C, or into liquid-filled containers, and is packaged after cooling while still submerged in the liquid. Vibrating may aid uniform spreading of the liquid cheese in the containers, e.g. small tins or tubes. W&Co

46

Some factors which influence the quality of liquids processed by the ultra-high-temperature system with aseptic filling. (In 'Proceedings of the 6th European Symposium' [see FSTA (1977) 9 10G719].) [Lecture]

Burton, H.

pp. 114-129 (1975) [20 ref. En, fr, de] [Nat. Inst. for Res. in Dairying, Reading RG2 9AT, UK]

The quality of UHT-sterilized, aseptically-filled products depends on both bacteriological and chemical properties. The importance of reliable

thermal death data for spoilage microorganisms and the effects of bacterial contamination after sterilization are discussed. Chemical quality is determined largely by O_2 content and the effect of light, both of which cause undesirable changes on storage. Transparent, O_2 -permeable containers are unsuitable for prolonged storage of UHT products. AS

47

Aseptic packaging of in-flow preserved fruit juices.
Loo, L. G. W. van der
Nordeuropaeisk Mejeri-Tidsskrift 43 (3) 66-71, 85 (1977) [En, Da, De]

A process similar to the UHT treatment of milk and milk products followed by aseptic packaging has been adapted by a number of dairies for the production of fruit juices and fruit juice concentrates. This article describes a Stork-Sterijuce plant for the processing of fruit juices. Juice at 10°C is heated by regeneration to 70°C and by steam heating to 95°C before being cooled by regeneration and cooling water to 20°C . Heating and cooling are performed in concentrically arranged stainless steel tubes wound into coils. Details are given of plant sterilization prior to production as well as various controls and protections that enable the plant to operate completely automatically. AP

48

[Aseptic packaging of foods in barrels.]
Aseptisches Verpacken von Lebensmitteln in Fässern.
Loire, P.
Verpackungs-Rundschau 28 (3) 266, 268, 270 (1977) [De, en, fr]

Aseptic packaging of foods in sheet steel barrels of capacity 208 l. (55 USA gal) is briefly discussed, with reference to heat- and HTST-sterilization of the product to be packaged. Improvements and design changes required for steel barrels to be fully acceptable for aseptic packaging are discussed; a specification for a steel barrel suitable for aseptic packaging is given. Applications of aseptic packaging in steel barrels are briefly considered, including fruit pulps and juices. Advantages claimed include economic handling, transport and storage, absence of chemical preservatives in the product, reduced wastage due to product residues in the container walls, and potential for re-use of the barrel. IN

49

[Testing of Aseptic Tetra Standard (AT), Aseptic Brik 1 (AB1) and Aseptic Brik 3 (AB3) aseptic packaging installations manufactured by AB Tetra Pak, Lund (Sweden).] Typprüfung von aseptisch arbeitenden Verpackungsanlagen der Typen Aseptic Tetra Standard (AT), Aseptic Brik 1

(AB1) und Aseptic Brik 3 (AB3). Hersteller: AB Tetra Pak, Lund (Schweden).
Biewendt, H.-G.; Reuter, H.; Wasserfall, F.
Kieler Milchwirtschaftliche Forschungsberichte 29 (2) 163-192 (1977) [10 ref. De, en, fr]
[Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The installations named in the title are photographically and diagrammatically illustrated and technical data on the AT 25, AT 150, AT 300, AT 500 and AT 1000 series; the AB1 500 and 1000 series; and the AB3 200, 250, 500 and 1000 series are presented in detail. Results are reported of tests carried out between 13 June and 19 Nov. 1971 on an AB1 installation and of tests carried out on an AT and an AB3 installation between 27 Nov. 1972 and 22 Nov. 1973. It is concluded that technical and microbiological tests have shown that the 3 installations are suitable for filling and sealing UHT milk packages under aseptic conditions. No objections are raised to official approval of the 3 installations tested. SKK

50

Design and performance of pilot scale HTST/UHT processing unit.

Anderson, M. E.; Marshall, R. T.; McBee, L. E.; Shelley, D. S.
American Dairy Review 38 (8) 10, 12-13 (1976)
[En] [112 Eckles Hall, Univ. of Missouri, Columbia, Missouri 65201, USA]

A brief illustrated account is given of a HTST/UHT processing unit (flow rate 2.49 l./min) which is used in university research and teaching and is available for contract research with industry. It comprises essentially a homogenizer, plate heat-exchanger, flow-diversion valve, valve for sampling, 3 holding tubes and control panel, but does not include a regeneration section. The product may be heated to 107°C in the hot water section and to 143°C in the steam section; min. holding time is 2 s. The operation of the unit is semi-automatic and holding times and temp. can be adjusted rapidly over a wide range. FL

51

[Some technological and physico-chemical characteristics of UHT sterilized cream.] [Review]
Vujicic, I.; Hassan, A. I.
Miljekarstvo 27 (4) 74-78 (1977) [8 ref. Sh]
[Poljoprivredni Fak., Novi Sad, Yugoslavia]

This review-type article deals with the different types of cream sterilized by UHT process; some technological characteristics of UHT treatment of the different types; and storage changes in taste, aroma and consistency, fat separation, and whipping capacity. SKK

52

Thermal death kinetics of *Bacillus stearothermophilus* spores at ultra high temperatures. I. Laboratory determination of temperature coefficients.

Davies, F. L.; Underwood, H. M.; Perkin, A. G.; Burton, H.

Journal of Food Technology 12 (2) 115-129

(1977) [18 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The inconsistencies reported between estimations of sterilizing efficiency (of UHT plants) based on the heating of bacterial spores in capillary tubes at sub-UHT temp. and detn. of sterilizing efficiency made by heating spores at UHT temp. in the plants themselves were studied. Capillary tube experiments were extended to 160°C with the aim of obtaining data suitable for direct comparison (no extrapolation) with those obtained by plant inoculation. As heat-treatment temp. were increased from 120° to 160°C the shape of the survivor curves became increasingly sigmoidal, possibly due to the greater significance of heat transfer times at high temp. Temp. coeff. for spores suspended in water were constant ($Q_{10} = 23.5$) $\leq 132.5^\circ\text{C}$ and for spores suspended in milk were constant ($Q_{10} = 13.2$) $\leq 142.5^\circ\text{C}$; beyond these temp., Q_{10} values gradually diminished. Such an effect could not be explained by Arrhenius kinetics and again may reflect the physical limitations of the capillary tube system. Its importance is discussed in relation to the value of capillary tube experiments for predicting the sterilizing efficiency of UHT plants. AS

53

Thermal death kinetics of *Bacillus stearothermophilus* spores at ultra high temperatures. III. Relationship between data from capillary tube experiments and from UHT sterilizers.

Burton, H.; Perkin, A. G.; Davies, F. L.; Underwood, H. M.

Journal of Food Technology 12 (2) 149-161

(1977) [8 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Thermal death data were obtained for *B. stearothermophilus* spores heated in (i) a laboratory scale, direct heating UHT plant and (ii) a larger scale direct heating UHT plant. These are compared with the corrected data from experiments in which spores of the same batch were heated in capillary tubes. Temp. coeff. (Q_{10} values) for inactivation of spores in UHT plants were higher than those for spores in capillary tubes but agreement was closer when spores were suspended in water than in milk. For aqueous spore suspensions, the discrepancy between plants and capillaries was least for (i). The divergence always became greater at lower temp. and the D values were coincident at 145°C. Possible reasons for these various effects are discussed. AS

54

Properties of aseptically packed ultra-heat-treated milk. Electron microscopic examination of changes occurring during storage.

Andrews, A. T.; Brooker, B. E.; Hobbs, D. G.

Journal of Dairy Research 44 (2) 283-292 (1977)

[28 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Changes in the appearance of casein micelles and fat globules in UHT milk were comparatively slight within a 14-month storage period although closer inspection often revealed the beginnings of some of the changes observed after even longer storage. Within this period the milks remained liquid and no evidence for any proteolytic breakdown was seen on electrophoretic examination. After 34 months the milks had all-gelled and there was evidence of a small amount of proteolytic breakdown. Electron microscopic changes were striking and depended on storage temp. At 4°C the casein micelles in the gel phase had become very 'spiky' and long tendrils often bridged micelles, forming extensive networks. At room temp. and at 30°C this tendril formation was less marked and the average micelle size was considerably greater than in freshly processed milk. There was also clear evidence for the coalescence of micelles. After storage at 37°C the micelles were much larger than in the other samples, often exceeding 0.4 nm in diam. AS

55

Chemical changes in ultra-heat-treated milk during storage. I. Hydrolysis of casein by incubation with pronase and a peptidase mixture.

Möller, A. B.; Andrews, A. T.; Cheeseman, G. C.

Journal of Dairy Research 44 (2) 259-266 (1977)

[20 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Casein samples from untreated milk and stored UHT milk were hydrolysed with pronase (protease from *Streptomyces griseus* K-1) and subsequently with a mixture of peptidases prepared from the microsomal fraction of hog kidneys. Incubation of casein from unheated milk with pronase alone hydrolysed 70-80% of peptide bonds involving Ile, Leu, Tyr, Phe and His residues; other amino acids were released less well and proline hardly at all. The pronase/peptidase treatment resulted in 90-100% hydrolysis of peptide bonds involving all amino acids, including proline. Caseins from stored UHT milks were more resistant to proteolysis than casein from unheated milk. Reduced release of all amino acids was observed from samples taken after storage at 37°C for ≥ 12 months and for lys, arg and Asn residues from sample taken after storage at 30°C for 14 months. Resistance to proteolysis was attributed to the Maillard reaction between milk proteins and lactose during storage of UHT milk. [See also following 2 abstr.] AS

56

Chemical changes in ultra-heat-treated milk during storage. II. Lactuloselysine and fructoselysine formation by the Maillard reaction.

Möller, A. B.; Andrews, A. T.; Cheeseman, G. C.

Journal of Dairy Research 44 (2) 267-275 (1977)

[11 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Lactuloselysine (ϵ -N-deoxylactulosyl-L-lysine) and fructoselysine (ϵ -N-deoxyfructosyl-L-lysine), formed by Maillard reaction, were identified in enzymic hydrolysates of casein from stored UHT milk. Furosine (ϵ -N-2-(furoylmethyl)-L-lysine) and pyridosine (ϵ -(3-hydroxy-4-oxo-6-methyl-1-pyridinyl)-L-norleucine) were identified in the corresponding acid hydrolysates. Enzymic hydrolysis of the caseins, gel filtration and preparative scale amino acid analysis were used to isolate the compounds which were then identified by reference to synthesized authentic compounds. Lactuloselysine formation was extensive and involved 10-30% of lysine residues in UHT milks stored at 30-37°C for 6 months-3 yr. Fructoselysine concn. was generally about 10% of the lactuloselysine concn. AS

57

Chemical changes in ultra-heat-treated milk during storage. III. Methods for the estimation of lysine and sugar-lysine derivatives formed by the Maillard reaction.

Möller, A. B.; Andrews, A. T.; Cheeseman, G. C. *Journal of Dairy Research* 44 (2) 277-281 (1977) [5 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

4 chemical methods were used in a comparison of the measurement of the extent of modification of lysine residues in casein during storage of UHT milk. Determination of homoarginine after reaction with *o*-methylisourea appeared to be the best measure of total lysine modification. Reduction with borohydride before acid hydrolysis prevented recovery of lysine from lactuloselysine and fructoselysine. This procedure gave values for these derivatives which were in good agreement with those obtained from the detn. of furosine in acid hydrolysates. Determination of lysine after acid hydrolysis showed that lysine loss was accounted for by lactuloselysine and fructoselysine formation in most of the samples. Browning was most apparent in UHT milk stored at 37°C for 3 yr and in this sample only part of the lysine residues was accounted for as lactuloselysine and fructoselysine, thus indicating that lysine had become involved further in sugar degradation products. [See also preceding 2 abstr.] AS

58

Packaging material for sterile aseptic milk. [Lecture]

Mehta, R. S.; Bassette, R.

Journal of Dairy Science 60 (suppl. 1) 49 (1977) [En] [Kansas State Univ., Manhattan, Kansas 66506, USA]

Sterile milk was aseptically packaged in cartons Al lined or of polyethylene (PE) and stored with or without overwrapping in Saran/Al/Saran for 42 days at room temp. under 200 ft-candles of fluorescent light. Lipid oxidation and browning were similar in all samples. Methyl sulphide content paralleled dissipation of cooked flavour. Pentanal and hexanal increased as stale flavour developed. [See FSTA (1977) 9 11P1719.] JMD

59

[Optimization and comparative evaluation of UHT plants.] Optimierung und vergleichende Beurteilung der UHT-Anlagen. [Review]

Hallström, B.; Dejmek, P.

Milchwissenschaft 32 (6) 324-327 (1977) [7 ref. De, en] [Abteilung für Lebensmittelwissenschaft, Univ. of Lund, Sweden]

This review article outlines UHT processes in common use and discusses, with the aid of mathematical models, the effects of time-temp. relationships on chemical and bacteriological quality of UHT milk prepared by direct and indirect heating methods. MEG

60

Proteolytic activity in ultra-pasteurized aseptically packaged bitter cream. [Lecture]

Richter, R. L.; Schmidt, R. H.; Smith, K. L.; Mull, L. E.; Henry, S. L.

Journal of Dairy Science 60 (suppl. 1) 169-170 (1977) [En] [Univ. of Florida, Gainesville, Florida 32601, USA]

Proteolytic activity of 2 commercial cream samples that developed a bitter flavour was max. at 37°C and at pH between 6.5 and 7.5. The samples were also tested for absence of microorganisms. [See FSTA (1977) 9 11P1719.] CDP

61

[Severity of milk heating in UHT processing.]

Wärmebelastung der Milch durch Ultrahocherhitzungsverfahren.

Renner, E.

Molkerei-Zeitung Welt der Milch 31 (15) 461-464 (1977) [6 ref. De] [Milchwirtschaftliche Abteilung der Justus-Liebig Univ., Giessen, Federal Republic of Germany]

The performance of 3 direct and 6 indirectly heated UHT processes is compared by the aid of temp.-time diagrams. Sterilization intensity was calculated at 10°C intervals (above 80°C) on the basis of a Q_{10} value of 9, and injury to milk constituents on the basis of a Q_{10} value of 3. Severity of heating was calculated to range from minimal adequate to 6.22-fold minimal for sterilization purposes, and from minimal to 4.99-fold minimal for injury to milk constituents. Reduced throughput increased injury to milk constituents relative to sterilizing effect; attainment of an equivalent degree of sterilization by rise of temp. and compensating reduction of time lowered it. Temp.-time diagrams provide a useful means of assessing the performance of UHT equipment. GTP

62

[Aseptic packaging of milk and beverages by spraying H_2O_2 .]

Anon.

Imballaggio 27 (246) 5-7 (1976) [It]

A description is given of the Combibloc Aseptic system tested by the Mannheim/Heidelberg central

dairy (German Federal Republic) for aseptic packaging of UHT milk (50 000-60 000 H_2O_2 -sterilized prepunched cartonboard/polyethylene/Al containers/day). The line can package 5000-10 000 l/h in 1-l. or 0.5-l. packs (with only 2-3 min required for changing between the 2 sizes). The containers are sealed longitudinally along a triple fold. 5 containers in every 5 pallets are checked for wt. and contents, and 5 containers in every pallet after 5 days in the store are sent to the laboratory for bacteriological testing. Of 530 000 containers examined about 8 wk after sale, only 0.07% were faulty (imperfect seal, not completely aseptic etc.). As a precautionary measure, the first and last 24 containers in each day's production are discarded. ADL

63

The review of UHT treatment and aseptic packaging in the dairy industry. [Conference Proceedings]

United Kingdom, Society of Dairy Technology
Journal of the Society of Dairy Technology 30 (3) 135-168 (1977) [14 ref. En]

The full text is given of papers presented at this 1-day symposium held on 2 Feb. 1977, at the Post House Hotel, Birmingham, UK. 7 papers are abstracted separately in FSTA, and are in the author index under **United Kingdom, Society of Dairy Technology [UHT Processing Symposium]**. AJDW

64

[UHT products.]

Guul, B.

Maelkeritidende 89 (25) 599-600, 602-604, 606-608 (1976) [Da]

Market trends and future prospects for UHT products are discussed, with particular regard to Denmark, where the share of UHT milk in the liquid milk market is expected to rise from 3% in 1976 to 7% (45 million l.) in 1980. This compares with expected market shares of 50% in Switzerland and Spain, 30% in France and 25% in Germany. Factors affecting the development of UHT products in Denmark are discussed, especially the refrigerated distribution network (many retailers do not have adequate refrigerated storage capacity to carry the full range of dairy products) and new legislation on milk, which may permit the development of a new range of flavoured milk beverages. The range of UHT products in Denmark has hitherto been much smaller than in other countries, mainly because UHT products are marketed via local dairies which regard them as competing with their own products. ADL

65

Aseptic processing and packaging of milk.

[Lecture]

Ellis, J. G.

Journal of the Society of Dairy Technology 30 (3) 148-150 (1977) [En] [Tech. Services Dep.,

Express Dairy (Milk) Ltd., S. Ruislip, Middx., UK]

The commercial aspects of aseptic processing and packaging of milk showing only a slow rise in the market are assessed. The paper describes 3 types of process plant, the indirect plate heat exchanger, indirect tabular heat exchanger and direct steam injection plants, and the various advantages are evaluated. Simplification of plants with the removal of de-gassers, flash cooling vessels, etc. is emphasized in the modern indirect plant which will heat, cool and homogenize as simply as possible. Differences between operation of a UHT carton dairy and an average bottling dairy are described. [See FSTA (1977) 9 12P2039.] AS

66

Aseptic packaging and processing of products.

[Lecture]

Wiles, R.

Journal of the Society of Dairy Technology 30 (3) 151-156 (1977) [En] [Milk Marketing Board, Thames Ditton, Surrey, UK]

The dairy industry has been instrumental in developing UHT processes and aseptic packaging. However, different standards may be necessary for foodstuffs other than milk. Products, their development and preparation prior to processing using existing technology and equipment are outlined. Heat treatment, commercial sterility and enzyme survival are discussed. The value and cost of proving aseptic systems are discussed together with suggestions for aseptically linking process and packing plants using aseptic tanks or otherwise. The accurate evaluation of equipment prior to purchase is stressed. A conclusion is drawn that the exploitation of UHT products is dependent on the development of truly aseptic packing machines. [See FSTA (1977) 9 12P2039.] AS

67

An introduction to ultra-high-temperature processing and plant. [Lecture]

Burton, H.

Journal of the Society of Dairy Technology 30 (3) 135-142 (1977) [14 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The principles of the UHT process are discussed, and the influence of processing temp. and time on sterilizing efficiency are explained. Available types of sterilizer are summarized, and particular attention given to the relative merits of direct and indirect heating processes. Aseptic filling processes used commercially are summarized. Finally, the bacteriological, chemical and organoleptic qualities of UHT milk are considered, with particular reference to their influence on the ultimate consumer. [See FSTA (1977) 9 12P2039.] AS

68

Progress and development of UHT milk and milk products in the UK dairy industry. [Lecture]

Leonard, M. H.

Journal of the Society of Dairy Technology 30 (3) 160-163 (1977) [En] [Tetra Pak Ltd., Orchard

Road, Richmond TW9 4NNU, UK]

The paper covers the history of UHT sales in the UK and explains reasons for the small sale of UHT milk. Sales are expected to rise significantly; more sterilized milk is being replaced by UHT, and skim-milk and flavoured milks are being promoted. UHT product sales are encouraging with cream, custards, desserts and ice cream established. With continual price increases, caterers and shops would want to reduce waste and require non-perishable goods. UHT processing could be beneficial to dairies for doorstep delivery as well as shop sales. Particular mention is made of the success dairies have had with aseptically packed juice. [See FSTA (1977) 9 12P2039.] AS

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FAB 10

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H. BROOKES

ASSISTANT EDITOR

1

Aseptic packaging.

Braun, J.; Sturm, W. (Alcan Research & Development Ltd.)

United States Patent 4 035 981 (1977) [En]

Containers for yoghurt or milk packaging material coated with a heat sealable lacquer are sterilized by exposure to sterilizing radiation prior to being filled with pre-sterilized products. The lacquer employed a type which has been stabilized against radiation damage. IFT

2

Packaging update. [Conference proceedings]

Anon.

Dairy and Ice Cream Field 160 (7) 33-40, 42-44; (8) 64, 66, 68, 70-72, 74-75 (1977) [En]

Papers presented at a 1-day seminar on dairy packaging, organized in Chicago in 1977 by the Packaging Institute, are given under 3 separate headings: Decorating plastic milk bottles: Decorating methods: an/overview, by R. Grossner (pp. 33-34); Where do you put the information?, by R. Burrington (p. 34); Pad transfer printing, by D. A. Karlyn (p. 35); Vacuum screen coding, by L. Nowak (p. 35); Hot melt screen printing, by M. G. Milikan (p. 36); Pressure sensitive labelling systems, by A. D. Bridenback (p. 36); Advantages of roll-fed labelling, by W. Weller (pp. 36-37); and Eye appeal: merchandising economically, by H. von Saspe (p. 38). Aseptic packaging: Long life packaging: an overview, by H. Wainess (pp. 39-40); Paper packages for long shelf life, by C. Russell (pp. 40, 42); Long life portion packaging, by R. Balko (pp. 42-43); Pouch packaging products for long shelf life, by E. Fleming (p. 44); and Plastic bottles for long shelf life, by R. Burrington (p. 44). Tub and ice cream packaging: Factors affecting developments in tub packaging, by S. G. Conerly (pp. 66, 68); Designing a package that sells, by J. N. Moran (pp. 68, 70); The marketing package, by G. Castellani (pp. 70-71); Providing added value for the consumer, by D. B. Smith (p. 72); Making containers in-plant, by A. M. Hull (p. 74); and Principles of in-plant container making, by R. Grossner (p. 75). FL

3

[Studies on the determination of reasons for non-sterile packages in aseptically packaged milk products. I.] Stand der Untersuchungen zur Ermittlung der Ursachen für unsterile Packungen bei aseptisch verpackten Milcherzeugnissen. I. Helmrigh, M.; Peisker, B.

Verpackung 18 (3) 75-78 (1977) [De, en, ru] [KDT, Inst. für Milchwissenschaft, Oranienburg, German Democratic Republic]

Reasons for non-sterile packages of milk products, particularly UHT milk, are discussed. Raw milk heavily contaminated with sporeformers is considered unsuitable for UHT processing. Of the packaging components used, cartonboard represents the greatest risk because of its quality

controlled during manufacture, the cartonboard be carefully packed, and left unopened in the dairy until immediately before use. Heat sealability of the material and quality of the coating also require a particular attention. IN

4

The pros and cons of sterile filling.

Permenter, P.

Brewers' Guardian 105 (10) 48-49 (1976) [En]

The advantages and disadvantages of adopting a sterile filling strategy for packaged beer production as opposed to a final pasteurization are discussed. Aseptic filling is cheaper, and guarantees a better retention of the beer character, but pasteurization gives an assurance of a sterile product at all times. JRR

5

Hydrolysis of lactose in milk and whey with minute amounts of lactase.

Dahlqvist, A.; Asp, N.-G.; Burvall, A.; Rausing, H. *Journal of Dairy Research* 44 (3) 541-548 (1977) [16 ref. En] [Dep. of Food Sci., Chem. Cent., Univ. of Lund, Lund, Sweden]

The enzyme used was Maxilact 40 000 (Gist-Brocades, Delft, Netherlands), which is a partly purified lactase from *Saccharomyces lactis*. Maxilact, at a concn. of 5 mg/ml (stabilized with 10 mg human serum albumin/ml), was sterilized by filtration through a Millex (0.22 µm) filter and injected into UHT milk or UHT whey contained in a commercial 1-l. paper package. The hole made by the syringe was sealed with melted paraffin and the contents of the package were mixed by inversion. The lactase had optimum activity and stability at pH 7, but was inactivated at temp. > 35°C. 5 mg Maxilact completely hydrolysed the lactose in 1 l. UHT milk incubated for 1 month at 20°C, but its activity decreased rapidly if bacterial contamination occurred. In sterile demineralized whey the Maxilact was stable at 4°C but was inactivated after 15-20 days at 24°C. MEG

6

Improvements in and relating to the sterilization of a tube material.

AB Ziristor

British Patent 1 450 009 (1976) [En]

Sterilization of the packaging material when formed into a tube for subsequent aseptic filling with e.g. UHT processed milk is carried out with UV light emitted from a fixed source inside the tube. It is claimed that the sterilization is effective and quick and causes only an insignificant rise in the temp. of the packaging material and the machine. FL

7

Effect of ultra-high-temperature steam injection upon constituents of skim-milk.

Hansen, A. P.; Melo, T. S.

Journal of Dairy Science 60 (9) 1368-1373 (1977)

[33 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Raw skim milk was heated to $143 \pm 1^\circ\text{C}$ by direct steam injection, held for 8-10 s, and vacuum cooled. Analyses of different chemical characteristics of UHT processed skim milk showed a decrease in pH, titratable acidity and Ca^{2+} compared with the control. Increases in sialic acid and sulphhydryls might be due to unfolding of protein moieties thus exposing glycoproteins containing sialic acid and buried sulphhydryls, and/or reduction of disulphide bridges in milk-proteins. Alteration of the native protein was determined by isolation procedures for specific proteins and by electrophoretic and densitometric techniques. Casein micelles were most resistant to alteration of their structure while whey proteins, especially β -lactoglobulins, were very susceptible to structural changes. These structural changes may be related to sedimentation and flavour problems associated with UHT milks. AS

8

[Maintaining the quality of UHT milk.] Ein Beitrag zur Qualitätserhaltung der UHT-Milch.

Wartenberg, E. W.

Deutsche Milchwirtschaft 28 (18) 564-569 (1977)

[23 ref. (available from author) De]

In the light of the author's own investigations and also results reported in the literature (presented in 2 tables and 12 graphs), the author discusses the qualities required of packaging for UHT milk. Particular attention is paid to the influence of the following factors on UHT milk quality: light, oxygen, and shaking of packages with or without a headspace. In general it is concluded that the dairy industry cannot afford the economic losses caused by oxidation and, despite arguments to the contrary, every effort should therefore be made to eliminate oxygen from both the milk and the package. ADL

9

Ultra-high-temperature treatment of milk and milk products.

Ashton, T. R.

World Animal Review No. 23, 37-42 (1977) [2

ref. En] [Woodhouse Ridge, Mavelstone Road, Bromley, Kent BR1 2PD, UK]

A brief account is given of the history of milk preservation, i.e. pasteurization, sterilization and UHT treatment. The range of UHT treatment systems is reviewed and illustrated in diagrams and photographs; practical and economic aspects are also considered. MC

10

The direct-heating process for the ultra-high temperature sterilization of milk.

Burton, H.

IFST Proceedings 10 (3) 130-136 (1977) [En]

[Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The author outlines basic aspects of the direct UHT process and then deals with the 2 types of the process (steam-into-milk and milk-into-steam), milk composition control, energy use, and finally with scientific aspects of direct and indirect processing (discussing briefly their advantages and disadvantages). FL

11

[Use of varnished fabric based on fluoroplast in dairy equipment.]

Tikhomirova, E. I.; Kosmachevskii, B. P.

Molochnaya Promyshlennost' No. 9, 14-15 (1977)

[Ru] [Vses. Nauchno-issled. i Eksperimental'no-konstruktorskii Inst. Prodovol'stvennogo Machinostroeniya, USSR]

Varnished cloths, based on glass fabric impregnated with a suspension of 'fluoroplast-4D' (polytetrafluoroethylene-type plastics), were used for making the protective sleeve for milk level regulators in machines for packaging UHT milk, to replace imported components. In tests at a dairy plant, the working life of the sleeves, 180-250 μm thick, was 6-8 wk and 2 types are recommended for use in APYa packaging lines. FL

12

[Investigation of the microbial quality of commercial UHT milk products.] Untersuchungen über die mikrobiologische Beschaffenheit der im Verkehr befindlichen H-Milch-Erzeugnisse.

Schaal, E.; Nöcker, F.

Archiv für Lebensmittelhygiene 28 (2) 56-61

(1977) [13 ref. De, en] [Staatliches Veterinäruntersuchungsamt, Taubeneiche 10-12, 5760 Arnsberg 2, Federal Republic of Germany]

1580 samples of UHT milk from 28 producers were examined microbiologically and for their compliance with food regulations immediately on receipt of samples and at the end of the guaranteed keeping time. Altogether 10% of the packages were faulty: 1.3% were spoiled due to putrefaction, souring or other off-flavours, 7.8% contained viable microorganisms without noticeable changes in taste, 1% were incorrectly labelled. The number of viable organisms was generally low (1-300 colony-forming units/ml) and sometimes only detectable by enrichment procedures. 94% of all strains were Gram-positive; initially, 44% were aerobic bacilli of the *Bacillus subtilis*-mesentericus group and 29% *Streptococcus lactis* (at the end of storage 27 and 35% respectively). 9% of samples with viable microorganisms had counts of 300-30 000, and 19% had counts of $> 30\ 000/\text{ml}$. Only 9 strains (in 0.6% of packages) were Enterobacteriaceae. The occasional presence of Gram-negative organisms was attributed to reinfection during packaging or imperfect seams. The definition of UHT milk is discussed. For official control, inspection of production units is preferred to sampling single products on the market. RM

13

[Changes in stored UHT milk.]

Görner, F.; Jancekova, J.; Nemcekova, K.
Prumysl Potravin 28 (8) 441-445 (1977) [26 ref. Sk] [Slovenska Vysoka Skola Tech.,
Chemickotech. Fak., Bratislava, Czechoslovakia]

Changes occurring in organoleptic, physical and chemical characteristics of UHT milk were studied in 24 samples during storage at 7° and 55° C over 4 wk. The extent of the changes was dependent on the temp.; at 7° C cooked flavour disappeared during the first wk, whilst at 55° C it was retained and the milk had a flavour reminiscent of evaporated milk. Titratable acidity at 7° C increased gradually at an irregular rate, but the total increase was small; at 55° C the overall increase was considerably higher, this being attributed tentatively to changes in milk proteins. pH decreases were also more pronounced in samples kept at 55° C. The contents of soluble proteins and amino N remained about the same during storage at 7° C; at 55° C the mean level of the former increased by 177%, whilst the latter rose 15% during the 1st wk and then remained essentially unchanged. FL

14

[Effect of UHT treatment on amino acid composition of milk proteins.]

Tylkin, V. B.; Tsaberyabaya, N. I.
Tovarovedenie 9, 47-50 (1976) [5 ref. Ru]

A study was made of the effects of UHT treatment (4 s at 140° C, by steam injection) and subsequent storage for 5-10 days on the amino acid composition of casein and whey proteins in cows' milk. UHT treatment reduced total amino acid content by 9.3%, with further losses of 1.7% during storage. The greatest losses were suffered by lysine (16.3%), cystine (16%), glutamic acid (14.5%) and methionine (13.1%). Essential amino acid content/100 g protein was 58.2 g in raw milk, 53.8 g after UHT treatment, 53.1 g after 5 days' storage (aseptically packaged in 0.5-l. cartons) and 52.3 g after 10 days' storage. ADL

15

[Influence of packaging on the quality of UHT milk.]

Luquet, F.-M.; Goussault, B.; Gouerec, J.; Gagnepain, M.-F.

Annales des Falsifications et de l'Expertise Chimique 70 (754) 331-340 (1977) [Fr]

UHT milk was packaged in 5 different ways: (i) in laminated polyethylene-cardboard-Al cartons in the absence of air; (ii) as for (i) but in the presence of air; (iii) in uncoloured heat-sealed plastics bottles with air present; (iv) in uncoloured plastics bottles with a heat-sealed Al-polyethylene cap and with air present; and (v) as for (iv) but using yellow plastics bottles. Examination of the ascorbic acid, riboflavin and folic acid contents and of organoleptic properties of the milks after storage at ambient temp. (in the presence or absence of light) for ≤ 4 months showed that packaging method (i) resulted in the least deterioration in the quality of

the UHT milk. Method (ii) enabled the milk to be kept for 3 months. In the translucent plastics bottles the milk rapidly acquired an unacceptable smell and taste, particularly when the bottles were exposed to light. MEG

16

The use of UHT milk in a tropical continent.

Niroumand, K.

Milk Industry 79 (7) 23, 26-27, 29 (1977) [23 ref. En] [Dep. of Applied Biochem. & Nutr., Univ. of Nottingham, Nottingham, UK]

Samples of crude and pure enzyme from *Bacillus cereus* were heated to 140-150° C for 1-2 s in a thin-walled metal coil, with temp. changes being controlled using a thermocouple. Dilute sub-samples of each were stored at 4 or 23 \pm 2° C. Caseolytic activity estimated after 1, 3, 5 and 7 h storage showed that higher concn. of the enzyme favoured regeneration. Max. regeneration of the crude enzyme occurred at pH 6.6 after about 3 h storage at both temp. with recoveries of 36 and 17% for 2 samples of crude enzyme stored at 23° C and 9.5 and 7.5% for 2 samples stored at 4° C. By comparison the figures for the pure enzyme for the 2 sets of samples were 49 and 10%, and 31 and 5%. Further experiments with buffered enzyme at 3 mg/100 ml UHT milk, pretreated at 80° C for 7 min, and raw milk from which it was produced, and stored at -10° C for 3, 6, 9 and 12 months showed losses of activity of 0.91, 2.1, 3.5 and 6.7% based on non-protein N and non-casein N detn. The clotting time of the enzyme from *B. cereus* was increased by UHT treatment from 95 to 480 s under the same test conditions. A 3-stage mechanism for gelation of UHT milk in relation to casein micelle structure is postulated. TRA

17

[Use of ultra-high-temperature and very short time treatment for the production of long life milk.]

Souza, G. de

Boletim do Instituto de Tecnologia de Alimentos, Brazil No. 48, 117-128 (1976) [9 ref. Pt, en]
[Inst. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

Milk was homogenized and treated by the UHT process, using the Stork-Sterideal system (with heating to 135-150° C for 2-8 s, cooling to about 25° C and aseptic packaging in a Tetra Pak machine). Results of analyses made before and after the UHT treatment are given, including titratable acidity, pH, fat content, TS, SNF, f.p. and density. In 4500 packages of flavoured UHT milk stored for 90 days at ambient temp., colour, flavour and odour remained normal, there was no coagulation or gelation, and supernatant fat was readily dispersed by shaking; only 5 packages were swollen (presumably owing to spore contamination). Solids found in the bottom of the packages are attributed to added thickening agents rather than protein denaturation. In 15 samples of UHT milk incubated for 5 days at 30° C and 10 days at 55° C, titratable acidity (16.8-17.0° Dornic)

and pH (6.5-6.7) remained normal. It is concluded that UHT treatment by the Stork-Sterideal system offers considerable advantages which justify its high cost. ADL

18

Aseptic packaging. [Review]

Mann, E. J.

Dairy Industries International 42 (12) 46-47; 43

(1) 19, 26 (1977; 1978) [36 ref. En]

[Commonwealth Bureau of Dairy Sci. & Tech., Lane End House, Shinfield, Reading RG2 9BB, UK]

This review article deals with recent developments in the subject, covering plant and uses of the process for packaging different dairy products (milk, cream, infant feeds etc.) into containers of different materials (cartons, plastics bottles, sachets). FL

19

[Storage of sterilized milk in laminated paper packs.]

Tytkin, V. B.; Tsaberyabaya, N. I.; Feofanov, V. D. *Tovarovedenie* 10, 37-40 (1977) [2 ref. Ru]

UHT milk (4 s at 140°C) was aseptically packaged in (i) normal polyethylene-coated Al foil/paper packaging, (ii) experimental waxed paper packaging with non-pigmented polyethylene, without foil, or (iii) experimental packaging without foil, with black-pigmented polyethylene as the inner ply. There were virtually no physico-chemical changes in any packages in the first 10 days of storage at 19-22°C, but after 30 days the milk in packages without foil had higher acidity and a greater degree of cream separation and protein precipitation than the milk in packages with foil. After 30 days, milk packaged in (i) had the highest organoleptic score and milk packaged in (ii) had the lowest score. In microbiological tests (3 days at 37°C) on 10 packages of each type, 3 packages of type (ii) were found to be non-sterile (in 2 the milk was bitter and in one acid in flavour); 2 packages of type (iii) also contained milk with bitter or acid flavour, but all packages of type (i) were sterile. It is concluded that UHT milk packaged in laminated polyethylene without foil cannot be guaranteed beyond 5 days, and such packaging material can only be recommended as a reserve. ADL

20

Milan is now selling milk with split milk sugar.

Hansen, R.

Nordeuropacisk Mejeri-Tidsskrift 43 (9) 310-315, 321 (1977) [En, De, Da]

UHT milk with 1.5-1.7% fat and 75% of its lactose hydrolysed to glucose and galactose is now commercially produced by Centrale del Latte in Milan, at a rate of 8000-10 000 l./day. The process is carried out in a reactor at 4-7°C, using a β -galactoside preparation immobilized in a stable fibre material (cellulose triacetate). The milk (packaged in 1-litre Tetra Brik cartons), which is sterile, apparently tastes like normal milk, but is

sweeter. A description of a pilot plant with a UHT sterilizer (capacity 120 l./h) is given and its operation explained. It is estimated that the dairy has so far sold 0.5-0.75 million l. of lactose-hydrolysed milk. FL

21

U.H.T.-processing and aseptic packaging.

Shew, D. I.

Australian Journal of Dairy Technology 32 (2) 59-62 (1977) [1 ref. En] [QUF Ind. Ltd., Brisbane, Australia]

This paper summarizes methods used for direct and indirect heating of UHT milk. The author then discusses some aseptic packaging processes (Dole Canning, Tetra Pak, Pure Pak, plastics sachets and bottles) and gives a brief account of the manufacture and packaging of UHT milk and UHT-treated milk products (ice cream mixes custards, desserts) by 5 Australian dairy companies. MEG

22

Aseptic processing & packaging - quality control.

Marriner, F. W.

Australian Journal of Dairy Technology 32 (3) 102-103 (1977) [1 ref. En] [Dep. of Dairy Tech., Hawkesbury Agric. Coll., Richmond, NSW, Australia]

This paper discusses the overall quality control of products processed by UHT heat treatment and packaged aseptically. The main factors to be considered are: the spore count of the raw materials and of the process equipment and containers, temp. recording of the heating process and container sterilization, temp. and duration of storage of the packaged product, rotation of stocks during marketing, and education of consumers to protect and refrigerate the product after opening the package. MEG

23

[Proteolysis in UHT-sterilized milk.]

Snoeren, T. H. M.; Evers, P. H. J.

Zuivelzicht 70 (6) 144-145 (1978) [9 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Casein was rapidly broken down to small peptides when milk was sterilized by direct UHT treatment for 4 s at 140°C and then stored at 28°C in 1-l. Tetra packs. The rate of proteolysis decreased with increasing fat content (0.07, 1.5, 3%). Starch gel electrophoresis revealed that the β - and α_s -casein were almost completely broken down after about 4 months' storage. As the milk contained only 29 000-59 000 bacteria/ml before UHT treatment, the proteolysis is attributed to native milk proteases rather than bacterial proteases. After longer UHT treatment (34 s at 140°C) there was virtually no proteolysis during 4 months' storage. It is thought that longer heating either inactivates the milk protease or renders the protein inaccessible to enzyme attack. ADL

24

[The milk of bricks and blocks.]

Anon.

Emballages 48 (350) 37-41 (1978) [Fr]

The Combibloc Aseptic CF 5000 machine, which can form, fill and seal >5100 milk cartons/h, has been introduced into France by its manufacturer PKL (Papier- und Kunststoff Linnich GmbH, German Federal Republic). PKL has also developed a similar machine with a capacity of 10 000 l/h [see *FSTA* (1977) 9 3F75]. Details are given of both machines, especially the CF 5000, whose operation is explained with the aid of diagrams. The Combibloc machines form the cartons from printed flat blanks (rather than from a roll) and enclose some air in the top of the carton. Separate sections of the article describe operations at the PKL plant in Germany and, in particular, the Kochsiek range of rotary heliographic equipment for printing of packages. A Kochsiek machine operating at 300 m/min is used by PKL to print the Combibloc blanks, as well as to cut them up and score them (180 m/min). ADL

25

Improvements in and relating to the treatment of dairy products.

Tetra Pak International AB

British Patent 1 477 087 (1977) [En]

Immediately before or during packaging, β -galactosidase is added into pasteurized or UHT sterilized milk to hydrolyse the lactose into glucose and galactose. The hydrolysis should continue for >1 day during which time the package should not be opened. With UHT milk, it is important that the enzyme is sterile to avoid re-infection. The milk is suitable for consumption by people suffering from lactose intolerance. FL

26

[Extending the use of aseptic preservation of food products.]

Fromzel', O. G.; Rogachev, V. I.

Konservnaya i Ovoshchesushil'naya

Promyshlennost' No. 12, 8-9 (1977) [Ru] [Vses. Nauchno-issled. Inst. Konservnoi Promyshlennosti i Spetsial'noi Pishchevoi Tekh., USSR]

Aseptic preservation, i.e. separate sterilization of products and packages followed by aseptic packaging and hermetic sealing of wrappers has found and every increasing application in the USSR. The method, which has many advantages, is described together with the equipment used. The product is heated to 120-150°C, cooled to 25-40°C and then filled into sterile wrappers. The equipment for aseptic preservation of juices is supplied to the USSR by Bulgaria and Hungary. Production lines for the preservation of semi-manufactured products (A9-KSK) and tomato paste (A9-KSI) are manufactured in the USSR; the technical design

was developed at the Prodmash in Odessa, the lines are manufactured by the Bolokhovsk machinery works. Sterilization by live steam and vacuum cooling is used. STI

27

[Continuous sterile packaging of fruit juices.]

Keimfreies Abpacken im Durchflussverfahren konservierter Fruchtsäfte.

Anon.

Industrielle Obst- und Gemüseverwertung 62 (13) 366-369 (1977) [De]

A schematic flow diagram is given of the Stork Steri juice plant for continuous sterile packaging of fruit juices. Before use, the plant is sterilized by circulating water at 140°C. As an example, the packaging of orange juice is described step-by-step through the 8 units making up the plant. HBr

28

Interaction of lactose and proteins of skim milk during ultra-high temperature processing.

Turner, L. G.; Swaisgood, H. E.; Hansen, A. P.

Journal of Dairy Science 61 (4) 384-392 (1978)

[24 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Incorporation of [¹⁴C]lactose into milk proteins following UHT processing was measured. When lactose was heated with casein micelles, α -lactalbumin and β -lactoglobulin in model systems, casein micelles incorporated the greatest amount of lactose. Raw skim-milk which had been dialysed against simulated milk ultrafiltrate and heated with [¹⁴C]lactose in capillary tubes to 143.5°C \pm 2 for 10 s gave a protein-lactose complex. The complex seemed covalently bonded because the label accompanied individual protein fractions during chromatography in the presence of urea and 2-mercaptoethanol on both Sephadex G-10 and DEAE cellulose. Identification and purity of protein fractions were assessed by vertical polyacrylamide gel electrophoresis. The 1st fraction eluted from the cellulose column exhibited the highest specific radioactivity. It appeared heterogenous as judged by polyacrylamide gel electrophoresis and by comparison of its amino acid composition with known milk proteins. κ -casein was identified in the 1st fraction by the presence of sialic acid and cysteine and by sensitivity to chymosin. The possible presence of γ_2 - and γ_3 -caseins was also indicated by electrophoresis and amino acid analysis. AS

29

[Developments in dairy technology.]

Entwicklungen in der Technologie der Milchverarbeitung.

Kessler, H. G.

Ernährungswirtschaft No. 11/12, 532, 535-536, 538-540, 542, 545 (1977) [12 ref. De] [Inst. für Milchwissenschaft & Lebensmittelverfahrenstechn., Tech. Univ. München, Weihenstephan, Federal

Republic of Germany]

The author deals with some developments in dairy technology with special regard to UHT processing (direct and indirect, aseptic packaging), ultrafiltration in cheese manufacture, and whey processing (ultrafiltration heat/acid precipitation, drying, single-cell protein manufacture). FL

30

UHT processing of fruit juice lowers refrigeration cost.

Kornmann, W.

American Dairy Review 40 (1) 24-26 (1978)

[En] [Stork Food Machinery, Inc., Somerville, New Jersey, USA]

Fruit juice subjected to UHT treatment (about 90°C for a few s) and packaged aseptically will keep for months without additives or refrigeration. Savings in energy costs (as refrigeration during processing, storage and handling are unnecessary) are estimated as \$76/day for a plant processing about 126 000 lb juice/8-h shift, and with refrigerated storage of juice for 1 month. Further savings occur during retailing; the estimated hourly costs of 0.5c/gal for keeping juices or milk refrigerated and 1c/gal for keeping concentrate frozen are eliminated. A typical Sterideal UHT plant is described briefly; it is made up of 4 compact pieces of equipment: automatic cleaning, heat exchangers, homogenizer, and monitoring and control unit. AL

31

[Characteristics of milk sterilized in Frau Steril System L.T. UHT plants.]

Bottazzi, V.; Panini Pecis, P.

Scienza e Tecnica Lattiero-Casearia 29 (1) 13-19

(1978) [10 ref. It. en] [Istituto di Microbiol.

Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

Chemical and microbiological analyses were carried out on milk samples obtained before, during and after UHT sterilization in 3 Frau Steril System L.T. plants with capacities of 8000 or 12 000 l./h. Results of analysis are tabulated in detail for the following characteristics: pH; titratable acidity; TS content; fat; SNF; total N; casein N; non-protein N; lactoglobulin N; albumin N; and N in immunoglobulins and proteose-peptones. The UHT milk samples from all 3 plants retained satisfactory organoleptic quality for > 6 months at ambient temp. UHT treatment did not increase the rennetability of the milk. Traces of proteolytic activity were rarely found. It was concluded that UHT treatment gave rise to stable micellar complexes and slowed down the gelling process. ADL

32

[Report on type testing of a type Sterideal ultra-high temperature installation manufactured by Stork Amsterdam B. V., Amsterdam, Netherlands.] Bericht über die Typprüfung einer Ultrahocherhitzungsanlage Typ Sterideal, Hersteller: Stork Amsterdam B. V., Amsterdam

(Holland).

Biewendt, H.-G.; Reuter, H.; Wasserfall, F.;

Teuber, M.

Kieler Milchwirtschaftliche Forschungsberichte 30 (1) 105-133 (1978) [De, en, fr] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

At the request of the manufacturers, a Sterideal indirect heating Type 4000 B UHT installation was type tested to cover installations of 1000, 2000, 4000, 6000 and 8000 l./h capacity. The installation is illustrated and described in detail. Details of the heat exchanger section are tabulated for 8 different installations in the Sterideal range of 1000-8000 l./h capacity; the flow diagram of the Sterideal type is presented, and the different steps of procedure are fully described, as well as the technical tests. Microbiological tests were carried out; and manufacturer's information about improvements and suggestions on optimal operation procedure were considered. A detailed summary of results is presented. On the basis of positive results obtained with the installation no objections are raised to its use for the production of UHT milk. SKK

33

Progress in the technique of milk pasteurization.

Rota, A.; Bottazzi, V.

XX International Dairy Congress E, 678 (1978)

[En] [Parmalat SpA, Parma, Italy]

Milk was UHT-sterilized in a tubular heat exchanger in which turbulence and milk flow rate were increased; the plant could operate at up to 12-13 kg/cm² and 160°C. The flow conditions reduced the formation of milk deposits, allowing continuous runs of > 40-50 h. [See *FSTA* (1978) 10 10P1408.] JMD

34

Process of removing the cooked flavour from milk.

Swaigood, H. E. (Research Triangle Institute)

United States Patent 4 053 644 (1977) [En]

Milk with a 'cooked' flavour resulting from heat treatment, e.g. UHT processing, is contacted with immobilized sulphhydryl oxidase to remove the cooked flavour, the sulphhydryl oxidase catalysing the conversion of sulphhydryls to disulphides. The treatment is preferably carried out at a temp. of 30-35°C. EJM

35

[Will future packaging of milk products be under sterile, low-microbial or clean conditions?] Werden Molkereiprodukte in Zukunft keimfrei, keimarm oder sauber abgefüllt?

Anon.

Deutsche Milchwirtschaft 29 (22) 723-724 (1978) [De]

This illustrated article contributed by the Hamba-Maschinenfabrik (Wuppertal, Federal Republic of Germany) reviews the development by the firm of aseptic packaging of milk products with particular reference to UV sterilization of packaging

materials, and it is claimed that not only low-microbial but fully aseptic packaging can be obtained by this means. SKK

36

[Aseptic packaging in cups.] Keimfreies Verpacken in Bechern.

Anon.

Deutsche Milchwirtschaft 29 (22) 717-718, 720-722 (1978) [De]

This illustrated article by a member of the staff of Firma Ganzhorn & Stirn (Schwäbisch Hall, Hall, Federal Republic of Germany) describes the range of packaging machines manufactured by the firm. The variants are: (i) Dogatherm 42/62 with equipment for supply of ready-made cups and intended for low-microbial filling of cups and closure with Al lids; (ii) Dogakombi 42/62 similar to (i) but capable of forming plastics cups or using ready-made ones; (iii) Dogaseptic 42/62, similar to (i) but incorporating packaging material sterilization (using H_2O_2 /hot sterile air) and intended for sterile filling and closing of ready-made cups; and (iv), combining the (ii) and (iii) principles. (i)-(iv) are coupled with a Sterimatic 30 installation for in place cleaning and disinfection. The 500 fully automated filling, closing and packaging line has a capacity of 10 000 cups/h. The various procedures are described in detail. The machines are suitable for milk, yoghurt, quarg, cream, puddings, cheese and fruit juices. SKK

37

Sulphur compounds and the flavour of UHT milk.

Görner, F.; Sedlak, J.; Heldak, J.

XX International Dairy Congress E, 713-714

(1978) [3 ref. En] [Slovak Tech. Univ., Bratislava, Czechoslovakia]

Changes in the contents of sulphhydryl and disulphide groups were studied in UHT milk on storage at 2-3° and 20-23°C. The max. cooked flavour occurred on the 3rd day in UHT milk stored at 20-23°C which coincided with the highest total sulphhydryls content, whereas at the lower storage temp. the sulphhydryls reached their max. on the 3rd day but cooked flavour was most pronounced on the 8th day. Similar results were obtained for disulphides. [See FSTA (1978) 10 10P1408.] FL

38

Effect of heat resistant lipases on changes in milk fat in UHT-treated milk.

Hladik, J.; Dolezalek, J.; Synkova, J.

XX International Dairy Congress E, 276-277

(1978) [En] [Inst. of Chem. Tech., Prague, Czechoslovakia]

Enzymes isolated from *Pseudomonas fluorescens* produced marked lipolysis in UHT milk during 3 wk storage; lipolysis by the enzyme from *Ps. putrefaciens* was less pronounced. Residual lipolytic activity of the enzymes after treatment at 120°C for 2 min was about 5%. Results indicated a possibility of

lipolytic changes occurring in UHT milk as a result of increases in *Pseudomonas* spp. in the milk prior to heat treatment. [See FSTA (1978) 10 10P1408.] CDP

39

[One of the largest cream-ripening installations in Gossau.] Eine der grössten Rahmreifetankanlagen Europas in Gossau.

Anon.

Schweizerische Milchzeitung 104 (55) 426 (1978) [De]

The butter factory in Gossau (Switzerland) installed in the spring of 1977 a large cream-ripening installation, comprising 2 tanks each of 35 000 l. capacity and 2 tanks each of 18 000 l. capacity, considered to be one of the largest in Europe. The tanks are provided with variable-speed drive stirrers for gentle agitation of the cream. FL

40

Proteolytic activity in UHT milk.

Corradini, C.; Pecis, P. P.

XX International Dairy Congress E, 716-717

(1978) [4 ref. En] [Dairy Res. Dep., Catholic Univ. "Sacro Cuore", Piacenza, Italy]

Milk was UHT-sterilized by direct heating at 150°C for 6 s, 145°C for 9 s. or 148°C for 9 s before aseptic packaging. Proteolytic activity was measured monthly during storage at room temp. until the samples gelled; this occurred after resp. 6, 8 and 9 months. The rate of gelation was related to proteolytic activity, presumably from reactivated protease. [See FSTA (1978) 10 10P1408.] JMD

41

Studies on the flavour of Alta ultra high temperature processed milk.

Zadow, J. G.; Hardham, J. F.; Bartlett, N.

XX International Dairy Congress E, 710 (1978)

[1 ref. En] [Dairy Res. Lab., CSIRO, Div. of Food Res., Highett, Victoria, Australia]

Raw Alta milk was standardized to 20% linoleic acid and 3.5% fat, UHT processed and packaged in sealed, air-free containers. Average grade scores were not greatly affected by storage temp. (2° or 20°C) over 3 months, or by storage at 2°C for 2 days after opening. 3 of the 4 graders strongly preferred milk containing antioxidant (BHA or tocopherol at 10 mg/kg). [See FSTA (1978) 10 10P1408.] DMK

42

Behaviour of sulphhydryl and disulphide groups in milk and milk proteins.

Bürki, C.; Blanč, B.

XX International Dairy Congress E, 287-288

(1978) [4 ref. En] [Swiss Fed. Dairy Res. Sta., Liebefeld, Bern, Switzerland]

In fresh and reconstituted milk, milk fractions and whey proteins, free SH groups increased at first

during heat treatment (reaching a max. after 10 min at 90°C), then decreased. Total SH groups and SH + SS groups decreased during heat treatment. During storage there were decreases in SH groups and also in volatile S compounds. The characteristic early flavour of UHT milk appeared linked to the latter. [See FSTA (1978) 10 10P1408.] ADL

43

Evaluation of time-temperature relationships in UHT processes.

Hallstrom, B.; Lopez, M.

XX International Dairy Congress E, 717-718 (1978) [6 ref. En] [Lund Univ., Food Eng. Dep., Alnarp, Sweden]

Time-temp. relationships are calculated for a number of commercial UHT plants. Using these data and given kinetic models, the Arrhenius function is calculated for the different UHT plants and for E/R equal to 11800° and 37300°K. F and C values are given for Z between 10° and 50°C. [See FSTA (1978) 10 10P1408.] AGP

44

Degradation of vitamin C during UHT treatment of milk.

Reuter, H.; Hoppe, A.

XX International Dairy Congress E, 712-713 (1978) [2 ref. En] [Fed. Dairy Res. Cent., Kiel Federal Republic of Germany]

After a holding time of 400 s, 6-7% more vitamin C was destroyed at 100° than at 60°C. There was no difference in vitamin C content of milk heated at 130° and 140°C with equal holding time. C values calculated for pre-heating and high temp. treatment allowed heat-induced changes for known time/temp. conditions to be determined. [See FSTA (1978) 10 10P1408.] DMK

45

Quantitative determination of bacterial lipolysis in milk products.

Knaut, T.

XX International Dairy Congress E, 365-366 (1978) [11 ref. En] [Inst. of Food Eng. & Biotech., Tech. Univ. of Agric., Olsztyn, Poland]

Recoveries of fatty acids added to milk were increased, from 19 to 59% for C4 and from 47 to 99% for C6, by adjusting the pH to 3 before extraction with ethanol followed by petroleum ether/ethyl ether. Lipolysis was estimated by this method in UHT-sterilized milk incubated for 0-8 h at 30°C with cultures of various ages of *Pseudomonas fluorescens* and an *Achromobacter* sp. [See FSTA (1978) 10 10P1408.] JMD

46

Influence of heat shock and variation of holding time on the sterilizing effectiveness of UHT treatments.

Cerf, O.

XX International Dairy Congress E, 610-611 (1978) [7 ref. En] [Lab. de Biochimie

Microbienne. INRA, Jouy-en-Josas, France]

Inactivation of *Bacillus coagulans* 604 spores was studied in a direct UHT sterilizer. A heat shock effect contributed to the spore inactivation, but its effect was offset by the variation of holding time at the sterilizing temp. [See FSTA (1978) 10 10P1408.] JMD

47

Changes in the content of free fatty acids in UHT milk during storage.

Schmidt, R.; Renner, E.

XX International Dairy Congress E, 275-276 (1978) [2 ref. En] [Dep. of Dairy Sci., Justus Liebig Univ., Giessen, Federal Republic of Germany]

Total free fatty acid (FFA) content in UHT milk at 4°, 20° and 38°C resp. was 0.28, 0.30-0.43 and 0.45-0.55% in the milk fat (expressed as oleic acid). FFA level in milk stored at 4°C increased by 18-29% over 4 months, while at 38°C FFA level in milk initially containing 3.5% fat (direct UHT process) and 1.7% fat (indirect process) increased from resp. 100 and 50 to 214 and 185 mg/l. The % composition of the FFA was similar to that of the triglycerides. [See FSTA (1978) 10 10P1408.] DMK

48

Fat globule membrane in UHT sterilized milk.

Vujicic, I. F.; Tanasin, L.; Veresbaranji, I.; Hassan, A. I.

XX International Dairy Congress E, 715 (1978) [1 ref. En] [Dep. of Dairy Sci., Fac. of Agric., Novi Sad, Yugoslavia]

Total fat globule membrane (FGM) yield of UHT milk increased during storage at 5°, 20°, 37° or 55°C, particularly at the higher temp. and in indirectly sterilized milk. Amount of lipid fraction was higher and protein fraction lower in directly than indirectly sterilized milk. Following UHT processing, the level of C4-C12 fatty acids (FA) increased from 9 to 12%. Storage had no significant effect on FA composition of the lipid fraction of FGM, but UHT processing and storage resulted in a decrease in the short-chain fatty acid composition of the FGM protein fraction. [See FSTA (1978) 10 10P1408.] DMK

49

The stability of milk of low pH towards UHT processing.

Zadow, J. G.

XX International Dairy Congress E, 711 (1978) [3 ref. En] [Dairy Res. Lab., CSIRO, Div. of Food Res., Hightett, Victoria, Australia]

Virtually no sediment was formed in whole milk at pH > 6.62 after UHT processing (140°C for 3 s). Below this pH sedimentation increased rapidly; at pH 4.8 virtually complete casein precipitation occurred. Sediment vol. of UHT-processed milk which had been preheated to 85°C for 3 or 30 min were very low at pH > 6.55, but increased as pH decreased; at pH 3.9 complete precipitation

occurred. UHT-processed milk containing added urea (50 mg/l.) behaved the same as control milk. [See FSTA (1978) 10 10P1408.] DMK

50

Stability of recombined ultra high temperature processed milk.

Zadow, J. G.; Hardham, J. F.

XX International Dairy Congress E, 974 (1978) [1 ref. En] [Dairy Res. Lab., CSIRO, Div. of Food Res., Highett, Victoria, Australia]

Virtually no sediment was formed after UHT processing (100-150°C for 3 s) of recombined milk, at pH 6.7 based on low heat dried skim-milk, or at pH 6.6 based on medium or high heat dried skim-milks. However, sediment formation increased rapidly as pH decreased; at about pH 6.5 and 6.4, resp., virtually all the casein and denatured whey proteins were precipitated. The amount of sediment was Ca-dependent. [See FSTA (1978) 10 10P1408.] DMK

51

The influence of milk powder, pH and heat treatment on the reflectance and stability of recombined milk sterilized by the ultra high temperature process.

Zadow, J. G.; Hardham, J. F.

Australian Journal of Dairy Technology 33 (1) 6-10 (1978) [10 ref. En] [Dairy Res. Lab., Div. of Food Res., CSIRO, Highett, Victoria, Australia]

The pH of reconstituted skim-milk was adjusted with acid or alkali or allowed to change due to action of natural bacterial contaminants. After UHT processing, the whiteness of the milk measured as reflectance using an Agtron reflectometer, reached a max. at pH 6.7 for milk prepared from low heat dried skim-milk, and pH 6.55 for medium or high heat dried milks. Below these pH values the reflectance decreased sharply because of the formation of considerable sediment in the product. Sediment formation increased sharply with decreasing pH until at pH about 0.2 below that of max. reflectance, virtually all of the casein and denatured whey proteins were precipitated. The proportion of sediment was dependent on the Ca^{2+} concn., an increase raising the amount of sedimentation, and a reduction reducing or completely preventing sediment formation. AS

52

Effect of ultra-high-temperature steam injection on model systems of α -lactalbumin and β -lactoglobulin.

Melo, T. S.; Hansen, A. P.

Journal of Dairy Science 61 (6) 710-713 (1978) [19 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Model systems, containing α -lactalbumin (α -La), β -lactoglobulin (β -Lg)A and β -Lg B, either singly or in combination, were heated to 143-149°C by

steam injection, held for 8-10 s and vacuum cooled. α -La was more resistant to heat denaturation when processed alone than when mixed with β -Lg. Variants A and B of β -Lg were sensitive to UHT processing. A new component with mobility intermediate between α -La and β -Lg formed after UHT processing. Analysis of the new component indicated that it was a protein complex of α -La and β -Lg. β -Lg was the major source of available SH-groups. The experimental sulphydryl value for a mixture of α -La and β -Lg was 17% lower than that calculated from the composition of the mixture. This was possibly because the SH groups are involved in formation of the heat-induced complex. AS

53

Influence of pasteurization and UHT processing upon the size distribution of casein micelles in milk.

Ruegg, M.; Blanc, B.

Milchwissenschaft 33 (6) 364-366 (1978) [19 ref. En, de, fr, es] [Fed. Dairy Res. Inst., Liebefeld-Bern, Switzerland]

Size distribution of casein micelles in raw and heat-treated bovine milk was determined using an electron microscopic technique (freeze-fracturing method). HTST processing and UHT with direct steam injection and indirect heating systems were applied. Size changes of casein micelles upon heating and homogenizing consisted mainly of an important increase in the number of free submicelles [< 20 nm diam.] and a small increase in the number of the largest particles [> 280 nm diam.] at the expense of medium size micelles. The small increase in the number of large micelles had a significant effect on the shape of the vol.-frequency distribution and increased the vol.-average diam. by about 25%. As judged from the size changes of casein micelles, the severity of the heating methods tested could be ranked in the order: HTST $<$ UHT direct $<$ UHT indirect. Size distributions in samples of HTST milk heated at 72°C for 15 s and 92°C for 20 s were not different within experimental error. AS

54

[28th testing of whipping cream by the German Agricultural Society (DLG).] 28. DLG-Schlagsahne-Prüfung 1978.

Koenen, K.

Molkerei-Zeitung Welt der Milch 32 (26) 833-835 (1978) [De]

A total of 282 samples of whipping cream (including 9 UHT) were tested for chemical, bacteriological, physical and organoleptic characteristics on 7th April 1978 in Krefeld. 81.6 of the samples were stated to have been pasteurized at $> 100^\circ\text{C}$, including 2 samples which were heated to 120°C ; the UHT samples were heated to 136-152°C. The fat content averaged 32.3%. Vol. increases of > 80 were obtained with 279 samples, most of them (174) giving values of 80-100%. In

organoleptic tests 244 samples obtained the max. number of points (5) for odour, flavour and appearance. In the overall assessment, 69.9% of the samples qualified for the highest award, 15.6% for the silver medal and 3.9% for the bronze medal. [See FSTA (1977) 9 12P2088 for a previous report.] FL

55

[Competition in the UHT milk market.]

Wettbewerb auf dem H-Milchmarkt.

Ramm, G.

Molkerei-Zeitung Welt der Milch 32 (16) 465-470

(1978) [De] [Bundesforschungsanstalt für Landwirtschaft, Braunschweig-Völkenrode, Federal Republic of Germany]

This is a detailed review of market conditions for UHT milk in the Federal Republic of Germany where UHT milk sales increased from 15 300 t (0.5% of total liquid milk sales and 0.9% of packaged liquid milk sales) in 1966 to 1.081 million t (32.5 and 41.2% resp.) in 1976. Numbers of UHT milk manufacturers increased from 13 in 1968 to 50 in 1976. Producers' prices of milk, pasteurized liquid milk and UHT milk in 1968 were DM0.38/kg, 0.522/l. and 0.728/l. resp., vs. DM0.53, 0.879 and 0.863 in 1975. The difference between highest and lowest UHT prices was 3.3% in 1968 and 10% in 1975. SKK

56

Steritherm-M-Alfa Laval's new UHT plant.

Anon.

Food Trade Review 48 (7) 402-404 (1978) [En]

A description is given of the Steritherm-M automatic plant for UHT treatment of various products, using plate heat exchangers for indirect heating of the product to sterilization temp. The equipment produced by Alfa-Laval Co. Ltd., of Brentford, UK, is compact, has a large and efficient heat transfer area in a small vol., and long operation times are achieved without impairment of product quality or cleaning effect. It is available in 4 sizes: 1000-2000 l./h; 2000-4000 l./h; 4000-6000 l./h; and 6000-8000 l./h. A description is given of: pre-sterilization of the plant; production of UHT milk; cleaning in place; and aseptic intermediate cleaning. VJG

57

Sterile-aseptic processing and packaging of milk at North Carolina State University. [Abstract]

Jones, V. A.; Hansen, A. P.; Swartzel, K. R.

Journal of Dairy Science 61 (Suppl. 1) 111-112

(1978) [En] [N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

The sterile aseptic system used is described and its operation discussed. After pre-heating at 73°C, the milk is heated by steam injection to sterilization temp., cooled evaporatively under vacuum, homogenized and cooled further in a tubular heat-exchanger. It can then be stored in a sterile tank or transferred directly for aseptic packaging. FL

58

The effect of enzymes from psychrotrophic bacteria on UHT-sterilized milk and on Cheddar cheese.

Law, B. A.; Sharpe, M. E.; Tzanetaki, E. L.;

Alichanidis, E.; Andrews, A. T.

XX International Dairy Congress E, 310-311

(1978) [3 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Psychrotrophic Gram-negative rods isolated from raw milk (especially *Pseudomonas fluorescens* strains) produced extracellular lipases and proteinases. The lipases remained partly active even after 10 min at 100°C. They caused rancidity in Cheddar cheese despite pasteurization (71°C/17 s). The proteinases survived UHT treatment and caused the milk to gel during storage. [See FSTA (1978) 10 10P1408.] ADL

59

Comparison of milks homogenized before and after ultra-high-temperature sterilization.

Perkin, A. G.

XX International Dairy Congress E, 709-710

(1978) [2 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

A taste panel could not detect any significant difference in chalkiness between UHT milk which had been homogenized before sterilization (upstream homogenization) and that homogenized after sterilization (downstream), either with steam injection or infusion heating, and at any age of the milk. However, a better homogenized product was produced with downstream homogenization for either sterilization method. [See FSTA (1978) 10 10P1408.] DMK

60

The biological availability of folate in stored ultra-heat-treated milk.

Ford, J. E.; Scott, K. J.; Blair, J. A.

XX International Dairy Congress E, 1069-1070

(1978) [3 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Milk was sterilized by the UHT indirect process and stored in darkness for 0, 1, 3, 7 or 12 days in sterile cotton wool-plugged bottles. Loss of folate during storage appeared to be greater in samples that had been adjusted to pH 3 before addition of ascorbate for folate assay (these conditions simulating exposure of the milk to gastric acid during digestion) than in control milk in which the pH was not reduced. Milk similarly treated but stored in airtight bottles showed no loss of folate over the 12 days. [See FSTA (1978) 10 10P1408.] DMK

61

UHT sterilization - energy economy vs. milk quality.

Hasting, A. P. M.; Cattell, G. S.

XX International Dairy Congress E, 679-680

(1978) [3 ref. En] [APV Co. Ltd., Crawley, Sussex, UK]

The use of a shell and tube exchanger in place of plates for the final heating section (85-140°C) of a UHT plant in order to overcome excessive pressure drop which limits the length of process run is described. Using milk with alcohol stability of 80-86% the length of run was increased from 4.5 h to 10 h, the limitation now being on heat transfer rather than pressure drop. Milk from the tubular system was considered to be slightly inferior in quality, due mainly to an increase in residence time through the heater. [See FSTA (1978) 10 10P1408.] AGP

62

[Study of type 01-OPZh plate heat exchanger as object for automation.]

Bykanov, Yu. D.; Shabshaevich, M. L.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti No. 45, 76-80 (1978) [4 ref. Ru] [VNIIMP, Moscow, USSR]

The operational flow sheet of an automated plant used for high-temp. treatment of milk (max. about 135-140°C) is shown. A thermodynamic study of the heating part was carried out to define optimal working conditions of its automatic control system. It is concluded from the formulae and data presented that steam supply may be limited to the sterilization section only. It is considered that the experimental values obtained could be applied to similar installations such as the Stork tubular sterilizer or the Soviet B6-OSN sterilizer. SKK

63

Effect of changing gross composition of milk on the concentration of volatile compounds involved in flavour.

Jaddou, H. A. W.; Evans, E. W.

XX International Dairy Congress E, 86-87 (1978) [En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Sulphur compounds, carbonyls and other flavour components were determined in volatiles from whole and skim-milks of low lactose, high whey protein or high alanine contents subjected to UHT- or in-bottle sterilization. H₂S and CH₃SH concn. were higher in low-lactose milk and in-bottle sterilized skim-milk. Lower concn. of CS₂, COS and methyl sulphide in low-lactose milk may have been due to loss of precursors during ultrafiltration. [See FSTA (1978) 10 10P1408.] JMD

64

Storage of UHT milk containing elevated levels of polyunsaturated fat.

Möller, A.; Andrews, A. T.; Hall, A. J.

XX International Dairy Congress E, 711-712 (1978) [1 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Production and subsequent storage in glass bottles of UHT milk (indirect heating at 140°C for 3 s) containing high levels of polyunsaturated fat, produced by feeding cows protected sunflower seed oil supplement, were not accompanied by any

special problems (e.g. decreased stability towards protein precipitation by ethanol, changes in fatty acid composition with storage, increased protein polymerization) except for off-flavour development, particularly during storage at 37°C. However, this was partially alleviated by addition of antioxidant. [See FSTA (1978) 10 10P1408.] DMK

65

Aseptic spring at GASTI.

Hansen, R.

Nordeuropæisk Mejeri-Tidsskrift 44 (3) 73-80 (1978) [En, Da, De]

The Ganzhorn & Stirn (GASTI) fully aseptic DOGAseptic 42 cup filling machine with accompanying programmed automatic CIP installation STERImatic 30 which cleans and sterilizes the machine before filling begins is described. GASTI's new series of machines are produced using a modular principle so that cup forming and transporting units can be added to filling and sterilizing units to produce a complete aseptic filling system. DOGAseptic 42 is capable of filling cups with a max. diam. of 95 mm and max. height of 120 mm at a rate of 4000-9000 cups/h. Cups are treated with H₂O₂ which is later dried off with heated air and can be filled with 3 different types of fluid or semi-fluid product. Pre-sterilized lids are heat-sealed on the cups before they leave the machine. Sterilization and filling take place within a closed area with an overpressure of sterile air. AGP

66

Milk - the Parmalat payoff.

Alexander, A.

Food Manufacture 52 (3) 44-46 (1977) [En]

The milk treatment facility at the Parmalat dairy at Collecchio, Italy, is described, with particular reference to the production of UHT milk and aseptic packaging with the Tetra Pak system. 90% of the milk production is UHT treated, in plant consisting of 5 units, 3 with capacities of 16 000 l/h, one with a capacity of 20 000 l/h, and one with a capacity of 8000 l/h for special products. Preheated milk at 80°C is heated to 142°C by steam injection and held at that temp. for 2.5 s before flash cooling, homogenization and aseptic packaging. JRR

67

Effect of process and storage conditions on flavor acceptability of sterile ultra-high-temperature steam injected whole milk. [Abstract]

Hansen, A. P.; Swartz, K.

Journal of Dairy Science 61 (Suppl. 1) 107 (1978) [En] [North Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Milk samples, all preheated to 78°C, were sterilized at 138°, 143° and 149°C for 20.3 s, at 143° and 149°C for 6.9 s, and at 149°C for 3.4 s and stored at 4°, 24° and 40°C for 0-24 wk. Flavour

in samples stored at 4° and 40° C resp. improved and declined with time. Prediction curves indicated that product flavour scores improve with storage temp. <31° C for a mean residence time of 20.3 s, at <24° C for 6.9 s, and <12° C for 3.4 s. DMK

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H. BROOKES

EDITOR

1

[Not the most expensive but the most reliable is the best. Packaging pumpable products in an aseptic form-fill-seal installation.] Nicht das Teuerste, nein – das Sicherste ist das Beste. Das Verpacken pumpfähiger Produkte in einer keimfrei arbeitenden Form-, Füll- und Verschlussanlage.

Vogel, S.

Ernährungswirtschaft No. 3, 36–40 (1978) [De]

The Gasti-Dogaseptic range of form-fill-seal packaging machines is for aseptic packaging of puddings, desserts, yoghurt, quarg, other milk products, jam, fruit juices etc. The 4- or 6-line versions have outputs of 160–240 cups/min. The major part is the unit for aseptic filling and sealing of the cups with an integrated in-place cleaning device (circulation cleaning and packaging material sterilization). Advantages claimed include: metering accuracy $\pm 0.5\%$, rapid change-over to different package sizes, possibility of consecutive filling of different products into one package, savings in labour, packaging materials and operating costs, and high degree of safety. FL

2

[Milk: aseptic plastics packaging.]

Anon.

Revue de la Conserve Alimentation Moderne No. 52, 75 (1977) [Fr]

A brief description is given of an installation that can be used for aseptic packaging of milk, fruit juice or other beverages. The 3 operations of manufacturing, filling and sealing the containers are carried out in a sterile enclosure in which a laminar flow of filtered bacteria-free air passes through at a slight pressure. The containers are filled by wt., using balances outside the sterile enclosure. MEG

3

[Sterilization of packaging materials for aseptic packaging. II. Studies on the microbicidal effects of C-band UV irradiation.] Entkeimen von Packmitteln beim aseptischen Abpacken. II. Untersuchungen zur keimabtötenden Wirkung von UV C-Strahlen.

Cerny, G.

Verpackungs-Rundschau 28 (10, Techn.-wiss. Beil.) 77–82 (1977) [12 ref. De, en] [Inst. für Lebensmitteltech. & Verpackung, TU München, Munich, Federal Republic of Germany]

The microbicidal effect of a new Brown-Boveri high-performance UV irradiation unit was studied, using suspensions of *Aspergillus niger* and *Penicillium frequentans* conidia, *Bacillus subtilis* and *B. stearothermophilus* spores and yeast (*Rhodotorula graminis* and *Sacharomyces cerevisiae*) cells sprayed onto the polyethylene surface layer of a polyethylene/Al foil/polyethylene/board/polyethylene laminate. Destruction of microorganisms was observed after UV irradiation for only a few s. The dependence of antimicrobial activity on distance from the UV source, angle relative to the UV source and air RH was studied using *Bacillus subtilis* spores. The potential for industrial use of this system is discussed; the method is relatively cheap, leaves no residues on the packaging material, and presents no air pollution problems. For

smooth, relatively dust-free surfaces with a low microbial count, irradiation doses of 120 mWs/cm² are sufficient to ensure sterilization of UV-resistant packaging materials. [See FSTA (1976) 8 12F538 for part I.] IN

4

[The combibloc packaging system is now complete.]

Das combibloc-Verpackungssystem ist komplett.

Anon.

Molkerei-Zeitung Welt der Milch 32 (30) 961–963 (1978) [De]

Two KPL aseptic packaging machines for use in the dairy industry are described. The cF 6.000 aseptic has a capacity of 6000 rectangular packs/h in 0.2, 0.25 and 0.5 l. sizes. It can be also used for pasteurized products employing packages without the Al liner. The other is combibloc cF 10.000 aseptic with an output of 10 000 packs/h in 0.5 or 1.0 l. sizes. It can also be used for pasteurized milk, and different products may be filled simultaneously. Package sterilization in both machines is with H₂O₂, and cleaning is by circulation of washing liquids. FL

5

Identification of volatile flavor compounds and variables affecting the development of off-flavor in ultra-high-temperature processed sterile milk.

Jeon, I. J.

Dissertation Abstracts International, B 37 (12) 6044: Order No. 77–12887, 122 pp. (1977) [En] [Univ. of Minnesota, Minneapolis, Minnesota 55455, USA]

Effects of ascorbic acid, oxygen, free-SH groups and non-enzymic browning on changes in concn. of flavour compounds were determined in UHT milks stored at 3°, 22° and 35° C, with or without added ascorbic acid. Ascorbic acid was an oxygen scavenger and helped to retain a small amount of -SH groups; it also caused noticeable browning at all 3 storage temp. Gas chromatography showed an increase in concn. of carbonyl compounds during storage. Changes in concn. of sulphur compounds varied considerably during storage between milks with and without the ascorbic acid. Aldehydes were found to be the most important contributory factor for off-flavours. DMK

6

Chemical analysis of flavour volatiles in heat-treated milks.

Jaddou, H. A.; Pavey, J. A.; Manning, D. J.

Journal of Dairy Research 45 (3) 391–403 (1978) [16 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Effect of heat treatment of milk on low mol. wt., volatile compounds was studied in order to relate changes in the flavour of milks to changes in chemical composition. Milks were heat treated in a UHT plant for 3 or 90 s at 140° C and stored at ambient temp. for periods up to 112 days. Volatile compounds in raw milk and in heated milks were isolated by a low temp. spray distillation technique and identified using gas chromatography and MS. Cabbagey defects in heated milks were correlated with total volatile sulphur, and it was concluded that H₂S, COS, CH₃SH, CS₂ and (CH₃)₂S could be responsible for this defect. AS

7

Inactivation of heat resistant proteases in normal ultra-high temperature sterilized skim milk by a low temperature treatment.

West, F. B.; Adams, D. M.; Speck, M. L.

Journal of Dairy Science 61 (8) 1078-1084 (1978) [12 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

12 raw skim-milk samples, all containing heat-resistant proteases and all except 1 meeting grade A raw milk standards, were sterilized in a Cherry-Burrell Unitherm steam injection system at 149° C for 4.5 s. Low temp. treatment (55° C for 1 h) of portions of the milks immediately after UHT sterilization resulted in 87-90% inactivation of the heat-resistant protease activity. No reactivation of the enzyme was observed in samples stored \leq 300 days at 25° C. 8 of the samples that did not receive the low temp. treatment showed signs of gelation and whey separation after 3 months at 25° C. There was no evidence of gelation in low temp. inactivated UHT milk, and the storage time required to produce bitter flavour increased 10-fold. The treatment did not affect the flavour or quality of the sterilized milk. MEG

8

The effects of ultra-high temperature steam injection processing on the quantity and composition of carbonyls present in milk fat. [Abstract]

McCarty, W. O.; Hansen, A. P.

Journal of Dairy Science 61 (Suppl. 1) 113-114 (1978) [En] [N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Milk was processed at 140.5° C for 4.4 s, vacuum cooled to 74° C, then indirect-cooled to 4° C; raw and UHT milk samples were centrifuged and the milk fat extracted with hexane. UHT samples showed an overall decrease in carbonyls of 11.2% compared with raw controls. There were qualitative and quantitative changes in methyl ketones and saturated aldehydes. Acetaldehyde, hexanal, heptanal, octanal and nonanal appeared to be heat-induced. JMa

9

[Alfa-Laval Steritherm - a new generation of UHT plants.] Alfa-Laval Steritherm - Eine neue Generation von UHT-Anlagen.

Bake, K.

Deutsche Molkerei-Zeitung 99 (13) 426-429; (14) 460, 462, 464 (1978) [De]

This communication from the Alfa-Laval organization describes the new Steritherm indirect UHT installations, I and II with aseptic homogenization for 4000 and 8000/4000 l/h resp., and III with non-aseptic homogenization for 5300 l/h. Development began 4 yr ago, and the installations have been in industrial operation for 2 yr. Photographs of assemblies in 5 dairy factories are presented and detailed flow-scheme, heat exchange, cleaning and cooling data are given. The main conclusions from practical experience are that runs of 13 h without cleaning may be achieved, and that consumption of steam and water was 10-15% below the manufacturer's stipulated

values, 0.035-0.04 kg steam and 0.33-0.41 kg water being used/kg product with 85-87% heat recovery. The new plate design is particularly emphasized. SKK

10

Aseptic canning.

Thorne, S.

Nutrition and Food Science No. 49, 2-5 (1977) [3 ref. En]

In aseptic canning, pre-processed foods are filled into sterile cans, thus obviating the need for retorting and producing a better quality product. The methods of achieving aseptic can filling are briefly discussed, with reference to heat exchangers for sterilization and suitable foods for the process. JRR

11

The effect of anti-oxidant and storage conditions on the flavour of Alta ultra high temperature processed milk.

Zadow, J. G.; Hardham, J. F.; Bartlett, N.

Australian Journal of Dairy Technology 33 (1) 11-13 (1978) [6 ref. En] [Dairy Res. Lab., Div. of Food Res., CSIRO, Hightett, Victoria, Australia]

Alta milk (ruminant milk containing fat high in linoleic acid) with or without butylated hydroxyanisole/tocopherol/Tween 80 antioxidant added on receipt, was standardized with Alta cream to 20% linoleic acid in fat and with Alta skim-milk to 3.5% fat, and then stored overnight at 2° C. After UHT treatment, the milk was stored for \leq 3 months at 2° or 20° C. Samples were graded weekly, each sample being re-graded after further storage at 2° C for 2 days after opening of the container. Statistical analysis of scores from 4 graders indicated that scores were not influenced by time or temp. of storage. 3 graders showed a strong preference for the milk containing antioxidant whilst the 4th grader showed a weaker preference for milk without antioxidant. CDP

12

On different modes of casein clotting; the kinetics of enzymatic and non-enzymatic coagulation compared.

Payens, T. A. J.

Netherlands Milk and Dairy Journal 32 (2) 170-183 (1978) [52 ref. En, nl] [Netherlands Inst. for Dairy Res., Ede, Netherlands]

The kinetics of enzymic and non-enzymic casein clotting is discussed in relation to the gelation of UHT short-time sterilized milk during storage. It is shown that a period of age-thinning followed by an explosive growth of the average particle wt. can be explained satisfactorily by the action of some clotting protease. The retarding influence of forewarming treatments on the flocculation rate constant of paracasein micelles is considered and very crude estimates of enzyme concn. are given. Model experiments on the clotting of casein by chymosin and trypsin are compared with predicted kinetic behaviour. The interpretation of turbidity and viscosity data in terms of the wt-average particle wt. is briefly examined. AS

13

Effects of UHT processing on the size and appearance of casein micelles in whole milk.

[Abstract]

Freeman, N. W.; Mangino, M. E.

Journal of Dairy Science 61 (Suppl. 1) 104 (1978) [En]

[Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

Whole milk samples heated to 129°, 138°, 146° or 154° C for 1.5, 3.3 and 9.0 s by direct steam injection were compared with raw milk samples by electron microscopy. At each temp. casein micelle diam. increased to a max. after heating for 3.3 s. Mean diam. were similar after 1.5 and 9.0 s, but longer heating caused increased micelle surface distortion and intermicellar cross-linking. Results indicate that initial heat-induced aggregation was followed by breakdown of aggregates into small cross-linked units. JMa

14

Effect of added phosphates and storage on changes in ultra-high temperature short-time sterilized concentrated skim-milk. I. Viscosity, gelation, alcohol stability, chemical and electrophoretic analysis of proteins.

Harwalkar, V. R.; Vreeman, H. J.

Netherlands Milk and Dairy Journal 32 (2) 94-111

(1978) [25 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

UHT short-time sterilized concn. skim-milk was examined for physico-chemical changes during storage at 28° C for 18 wk. Milk samples were allowed to gel at different intervals of storage, the gelation being accelerated by addition of sodium phosphate (1.5 g/kg) and delayed by addition of hexametaphosphate (1.5 g/kg). Milk proteins were separated into a pH 4.6 precipitate, which consists predominantly of casein, and whey proteins which were further fractionated into (i) proteins insoluble in 2% TCA, (ii) proteins soluble in 2% but insoluble in 12% TCA, and (iii) non-protein N (soluble in 12% TCA). As storage continued, the amount of pH 4.6 precipitate from stored milk was found to be smaller and the amounts of (i) and (iii) were larger, whereas the amount of (ii) remained almost unchanged. No change was observed in the pH, inorganic P or sialic acid distribution. Several changes in the starch-gel electrophoretic patterns of the different protein fractions were observed. However, none of these chemical changes could be correlated with the rate of gelation, since they had occurred to approx. the same extent in all samples after any given period of storage. The rate of gelation could be correlated with changes in relative viscosity and loss of stability to ethanol. AS

15

Estimation of the lowering of the oxygen tension in a flow-through cell as a practical means of detecting non-sterility in aseptically packed UHT-sterilized products.

Langeveld, L. P. M.; Bolle, A. C.; Cuperus, F.

Netherlands Milk and Dairy Journal 32 (2) 69-79

(1978) [6 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

The O₂ tension was measured in directly or indirectly heated UHT-sterilized milk products (milk, chocolate milk, cream, vanilla, chocolate and caramel custards) packed aseptically in Tetra Brik or Pure Pak cartons or in polystyrene beakers. Marked decreases in O₂ tension were found when indirectly heated UHT milk, inoculated with bacteria from spoiled UHT products, was incubated in screw topped bottles (filled to 85% of their vol.) for 5 days at 30° C. Tetra Brik packs filled with directly sterilized milk, and inoculated with spoilage bacteria by means of a sterile syringe, also showed a reduction in O₂ tension after similar incubation. Since the initial O₂ tension of this type of milk was low, the decrease was too small to be used to detect microbial growth. Examination of the O₂ tension and bacterial counts of commercial packs of milk, coffee cream and custard after incubation at 28-31° C for 4-8 days confirmed that the O₂ tension was reduced by microbial growth. It is concluded that measurement of O₂ tension provides a reliable method for detecting non-sterility in non-viscous products having an O₂ tension > 50 mm Hg. Problems associated with measurement of non-sterility in viscous products are discussed, and a device for continuous measurement of O₂ tension in aseptically packaged UHT milk is described. 3 packs/min can be tested. MEG

16

[Study of UHT treatment of skim-milks with different protein contents and of their fermentation.]

Lukac-Skelin, J.; Hansen, P. S.

Млјекарство 28 (2) 32-37 (1978) [6 ref. Sh]

[Poljoprivredni Fak., Zagreb, Yugoslavia]

A sample of (i) skim-milk, containing 3.5% protein, from the dairy of the Government Dairy Industry Research Institute (Statens Forsøgsmejeri) in Hillerød, Denmark, was pasteurized at 85° C for 15 s and ultrafiltered on a DDS-DDMM installation with GR 6X membranes at 10-14° C and 6.3 kg/cm² pressure. Milks of (ii) 2% and (iii) 6% protein content were obtained by appropriate mixing of the protein concentrate and the permeate; and (iv) milk with 4.5% protein was obtained by mixing skim-milk and protein concentrate from ultrafiltered whey. (i)-(iv) were sterilized on a PSM type C91 Palarisator of 1800 l/h capacity and aseptically packaged in 150-ml cups. Data are tabulated on protein, lactose, ash and TS contents of (i)-(iv), on their protein composition and free SH contents before and after UHT treatment, and on their Maillard reactions and viscosities before and after UHT treatment and (Maillard data only) after storage for 2 months at 5° or 20° C. Contents of undenatured whey proteins in (i)-(iv) resp. were 9.2, 10.7, 11.0 and 20.5% of total protein before UHT treatment, and 7.1, 6.3, 4.9 and 10.8% after treatment. The Maillard reaction was markedly inhibited in UHT-treated (iv) in comparison with (i)-(iii) and its content of free SH was correspondingly markedly increased. (i)-(iv) (not UHT-treated) were fermented at 42° C with 3% Ch. Hansen Laboratory yoghurt starter to pH 4.25 and cooled to 5° C; viscosities before and after fermentation were positively related to protein content. SKK

17

Bacteriological evaluation of UHT milk.

Lück, H.; Mostert, J. F.; Husmann, R. A.

South African Journal of Dairy Technology 10 (2) 83-85 (1978) [9 ref. En, af] [Anim. & Dairy Sci. Res. Inst., Irene, 1675, South Africa]

Samples of UHT milk (processed by the direct system in a commercial plant and aseptically packaged in 'Tetra Brick') were incubated at 30° C for ≤ 14 days or at 55° C for ≤ 7 days. Results indicated that an incubation period of 3 days at 30° C was too short to detect non-sterile packages. Only 17.6% of the 34 defective packages found after 2 wk, were detected after 3 days. After 7 days, 67.6% of the defective packages were detected. An incubation period of 5-7 days is recommended for the production control of UHT milk. One incubation temp. (30-35° C) is sufficient to detect non-sterile packs. The titratable acidity test was the most suitable for detecting spoilage after incubation, followed by the alcohol stability, colony count and organoleptic tests. 76% of the 25 defective units tested contained bacilli whose spores probably survived the heat treatment, 32% showed a pure thermophilic spoilage (at 55° C but not at 30° C) and 12% contained non-sporeforming bacteria (probably air infections). AS

18

Effect of time and temperature of UHT-milk during processing. [Lecture]

Reuter, H.; Hoppe, A.

International Congress of Food Science & Technology - Abstracts p.277 (1978) [En] [Inst. of Process Eng., Fed. Dairy Res. Cent. Kiel, D-2300 Kiel, Federal Republic of Germany]

Total vitamin C activity was used as a parameter for heat-induced alterations in milk during direct UHT-sterilization. In the temp. range 100° to 125° C, heat resistance increased with increasing temp., whilst at temp. > 125° C, heat resistance was independent of temp. [See FSTA (1979) 11 2A60.] CDP

19

The effect of fat and temperature on the concentration of thiamin in UHT-milk during storage.

Feldheim, W.

International Congress of Food Science & Technology - Abstracts p.278 (1978) [En] [Dep. Human Nutr., Christian-Albrechts-Univ., 2300 Kiel, Federal Republic of Germany]

UHT-milks containing 0.3, 1.5 or 3.5% fat were stored at 4° or 22° C for up to 12 wk. Thiamin losses were statistically significant after 1 wk storage in the milk with high fat content stored at 22° C, and after 10 wk in skim-milk stored at 4° C. [See FSTA (1979) 11 2A60.] CDP

20

[Sterile canning of fruit juices by continuous flow process.] Keimfreies Abpacken im Durchflussverfahren konservierter Fruchtsäfte.

Anon.

Industrielle Obst- und Gemüseverwertung 63 (15) 408-410 (1978) [De] [Stork-Amsterdam BV, 1021 Amsterdam, Netherlands]

A plant for aseptic canning of fruit juices, marketed as "Stork Steri Juice", is described with the aid of photographs and a diagram. Based on a system of jointless stainless steel pipes, it can process about 8000 l/h of unsweetened orange juice, 11.5° Brix, 3.5% pulp and 1.0458 density at 20° C at an entry temp. of 10° C, and a sterilization temp. of 95° C. The operation and cleaning of the plant are described. The plant is available in any required capacity. RM

21

[Changes in milk proteins related to selected conditions of UHT treatment and storage.] Über Veränderungen der Milchproteine in Abhängigkeit von ausgewählten Bedingungen der Hoherhitzung und der Lagerung. [Thesis]

Farah, Z.

165pp. (1975) [116 ref. De] Berne, Switzerland; Berne University

After an introductory section (pp. 1-32) dealing with the composition of milk, methods of heat treatment and their effect on milk, a detailed report is given of experiments investigating the changes that occur in milk proteins during heat treatment and storage of UHT milk, with a view to elucidating the chemistry of the thickening and gelling phenomena. In the experiments, milk was subjected to UHT treatment by steam injection for 0.8 or 2.4 s at 150° C, 10 s at 142° C or 100 s at 129° C, and stored at 20°, 33° or 45° C. Control samples were autoclaved for 17 min at 116° C. Changes in N distribution were studied by the method of Aschaffenburg & Drewry, by electronmicroscopy, and by polyacrylamide gel electrophoresis. ADL

22

[UHT installations for sterilizing milk and liquid milk products.] [Review]

Loo, L. G. W. van der

Zuivelzucht 70 (43) 9-16 (1978) [44 ref. Nl]

This review published in the Machevo supplement describes direct and indirect systems for UHT treatment of milk and discusses problems relating to steam quality, effects on product colour and flavour (through Maillard reactions etc.), and effects on product composition (in particular the problem of steam condensate which must be removed from the product after direct UHT treatment). Finally, new developments in UHT systems are reviewed, with detailed descriptions of equipment produced by manufacturers in a number of countries. ADL

23

Improvements in or relating to the treatment of milk. Jentsch, H. G.

British Patent 1 517 905 (1978) [En]

The process intended to improve the keeping quality of milk comprises pasteurization at preferably 105° C to produce a product substantially free of bacteria, cooling to 70-80° C, aseptic filling at this temp. into heat-resistant substantially gas-tight plastics packages, and

cooling in stages (first to about 50–55°C and then to the desired storage temp.). It is claimed that the milk can be kept for 2–6 wk, depending on its initial quality. FL

24

[Effect of disinfectants containing peroxide on pyruvate and α (+)-lactate in milk.] Einwirkung von peroxidhaltigen Desinfektionsmitteln auf Pyruvat und α (+)-Laktat in Milch. [Thesis]

Döring, G.

96 pp. (1977) [many ref. De, en] Hannover, Federal Republic of Germany; Tierärztliche Hochschule

Effects of 15 disinfectants on pyruvate, α (+)-lactate and bacterial counts in UHT milk and raw milk were studied. None of the disinfectants affected α (+)-lactate, but 4 disinfectants (Perhydrol, P 3 oxonia aktiv, Dosyl 3 plus and P 3 dix powder, all based on H_2O_2) reduced the pyruvate level. 10 p.p.m. H_2O_2 was sufficient to eliminate 7 p.p.m. pyruvate in sterile UHT milk. In raw milk, about 30 p.p.m. H_2O_2 was needed to eliminate pyruvate. Tests in 2 UHT plants indicated that pyruvate levels in packaged UHT milk fell by 30–70% within 24 h through the action of H_2O_2 used for disinfection of packaging equipment. It is suggested that contamination of milk by H_2O_2 in dairies can be detected by pyruvate detn. ADL

25

Organoleptic, chemical and microbiological changes in ultra-high-temperature sterilized milk stored at room temperature.

Mehta, R. S.; Bassette, R.

Journal of Food Protection 41 (10) 806–810 (1978) [11 ref. En] [Dep. of Animal Sci. & Ind., Call Hall, Kansas State Univ., Manhattan, Kansas 66506, USA]

Effects of carton materials on flavour of UHT sterilized milks stored for 100 days at $22 \pm 2^\circ C$ were investigated. Flavour scores of stored milk decreased concurrently with an increase in stale flavour. At the same time, propanal, pentanal, hexanal and an unidentified compound increased; cooked flavour along with methyl sulphide and another unidentified compound decreased. Differences in browning were observed between UHT sterilized and reference (freshly pasteurized) milks and between 2- and 12-day-old UHT sterilized milks. Thiobarbituric acid values did not increase (indicating no lipid oxidation) until after the milk had been stored for 22 days; however, those values were below that which would be detected organoleptically. Abnormally high acetaldehyde concn. were related to the ethylene oxide sterilizing pretreatment of the cartonboard. Reference milk was superior in flavour to milk from all other treatments. (i) Al foil-lined cartons were less permeable to gases than were (ii) polyethylene-lined cartons. Milk in (i) retained desirable flavour characteristics longer than did that stored in (ii). Wrapping cartons with Saran and Al foil was detrimental to flavour in all instances. Analysis of variance of microbiological data established that there were no differences in numbers of microorganisms in the different types of cartons during 42 days. AS

26

[Hydrolysis of lactose in milk and whey with minute amounts of lactase.] Hydrolyse von Laktose in Milch und Molke mit geringen Mengen von Laktase. Dahlqvist, A.; Asp, N.-G.; Burvall, A.; Rausing, H. *Deutsche Milchwirtschaft* 29 (37) 1330–1334, 1336–1337 (1978) [16 ref. De] [Chem. Cent., Univ., Lund, Sweden]

See FSTA (1978) 10 1P81.

27

A closer look at aseptic canning.

Green, J.

Food Engineering International 3 (8) 21–23 (1978) [En] [Res. & Development Div., H. J. Heinz Co. Ltd., Hayes, Middx., UK]

See FSTA (1977) 9 4F134.

28

[Method of sterilizing objects with H_2O_2 .] Verfahren zum Sterilisieren von Gegenständen mit H_2O_2 . Heiss, R. (Papier- und Kunststoff-Werke Linnich GmbH)

German Federal Republic Patent Application 2 703 524 (1978) [De]

Packaging materials (containers) are sterilized by spraying with H_2O_2 in vapour form only by using hot air at 100–200°C, preferably 110–160°C to form a vapour cloud and avoid any condensation of sterilizing agent in the containers, e.g. of fruit juices, and thus avoid any deterioration in flavour or in vitamin C content due to residual H_2O_2 . W&Co

29

Inactivation of native milk proteinase by heat treatment.

Driessen, F. M.; Waals, C. B. van der

Netherlands Milk and Dairy Journal 32 (3/4) 245–254 (1978) [22 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

Thermal inactivation of the natural proteinase in aseptically-drawn milk was estimated from the increase in concn. of proteolytic products using polyacrylamide gel electrophoresis and densitometry. The D value (heating time necessary to reduce proteinase activity to 10% of its initial value) decreased from 55.6 min at 67.5°C to 7 s at 142°C. An equation derived from an Arrhenius plot of inactivation of natural milk proteinase could be used to calculate D value at any temp. in the range 67.5–142°C; extrapolation gave a D value of 3.5 s at 142°C. Since this enzyme can cause proteolysis in UHT-treated milk products, a holding time of ≥ 16 s is recommended for UHT treatment at 142°C. CDP

30

Effect of added phosphates and storage on changes in ultra-high temperature short-time sterilized concentrated skim-milk. II. Micelle structure.

Harwalkar, V. R.; Vreeman, H. J.

Netherlands Milk and Dairy Journal 32 (3/4) 204–216

(1978) [12 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

Samples prepared and stored as described in part I [FSTA (1979) 11 2P211] were studied by thin-section electron microscopy. Rate of gelation was accelerated by addition of orthophosphate and delayed by addition of hexametaphosphate. Casein micelles in these conc. milks were larger than the native micelles of raw skim-milk. Micelle structure changed gradually with increase in viscosity; a slight distortion of the micelles and development of thread-like tails on their perimeters was followed by the appearance of pairs and triplets. At the time of gelation the micelles aggregated into longer interconnected chains. Orthophosphate-treated samples showed changes similar to those of the untreated samples at corresponding stages of gelation, whilst micelles in the hexametaphosphate-treated samples remained apparently unchanged and well-separated throughout 17 wk storage at 28° C. Addition of 0.03 or 0.06% H₂O₂ after or 0.1% H₂O₂ before UHT treatment considerably accelerated gelation. CDP

31

[Requirement criteria for high-capacity packaging machines in the 80s.] Anforderungskriterien an die Hochleistungsabfülltechnik der 80er Jahre.

Kessler, H. G.

Deutsche Milchwirtschaft 29 (51/52) 1874-1875, 1878-1879 (1978) [De]

Requirements for UHT milk packaging machines for the 80s, include the suitability for handling large quantities of milk with the min. of labour, elimination of bottle-necks, as versatile application as possible with rapid change-over to different package sizes and different products, reliability, easy maintenance and good accessibility. FL

32

[Prolongation of conservation of fruit juices.]

Loo, L. G. W. van der

Revue de la Conserve Alimentation Moderne No. 59, 79-81 (1977) [9 ref. Fr]

A new, compact unit for combined UHT treatment and aseptic packaging of fruit juices (the SteriJuice) has been developed by Stork, Amsterdam. The product suffers no loss of flavour and can be stored at ambient temp. for 4 months. It is not necessary to use temp. as high as those required for UHT treatment of milk, but measurement and flow control devices must be incorporated within the completely sterilized circuit. The unit is based on the same principle as the Stork UHT sterilizer for milk, using a system of double tubes arranged in 2 spirals which provide heating, regeneration and cooling sections, plus a unit for circulation cleaning and sterilization. The juice flows through closed, stainless steel tubes without branches or joints. Assuming a flow of orange juice (density 1.0458, Brix 11.5°, suspended solids 3.50%) at 8000 l/h and entry temp. 10°C, the juice passes from a small float-controlled reservoir to the regeneration section. Product temp. is raised to 70°C by outgoing juice at 95°C; outgoing juice is cooled to 35°C and then to 20°C in a final water cooling section. The whole system is first sterilized by circulation of water at 140°C. The

product is heated to 95°C by indirect steam in the heating section, avoiding direct contact between juice and steam. ELC

33

[Studies on the thermophilic bacteria in raw milk and dairy products. I. Distribution of thermophilic bacteria in raw milk and city milk.]

Byung-Kyu Choi

Korean Journal of Food Science and Technology 8 (1) 6-11 (1976) [16 ref. Ko, en] [Dep. of Anim. Food Tech., Kon Kuk Univ., S. Korea]

330 strains of thermophilic bacteria from raw milk, HTST milk and UHT sterilized milk were isolated after heat treatment at 65° C for 30 min. Isolates were identified as *Bacillus stearothermophilus* (125 strains), *B. coagulans* (69), *B. subtilis* (57), *B. cereus* (76) and *Lactobacillus thermophilus* (3). Vegetative cells of some of the strains in skim-milk survived heating at 85° C for 20 min, but none survived heating at 100° C for 10 min. [From En summ.] MEG

34

Production of volatile flavor compounds in ultra high-temperature processed milk during aseptic storage.

Jeon, I. J.; Thomas, E. L.; Reineccius, G. A.

Journal of Agricultural and Food Chemistry 26 (5) 1183-1188 (1978) [36 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

Volatile flavour compounds in UHT processed milk were investigated to determine their role in off-flavour development during aseptic storage. The milk samples were processed at 145° C for 3 s, with and without added ascorbic acid, and stored at 3°, 22°, or 35° C for 5 months. Flavour isolates were prepared by steam vacuum distillation and subsequent extraction of the distillate with dichloromethane. The isolates were analysed using gas chromatography and MS. The milk was regularly analysed by various chemical methods and evaluated by a taste panel during storage. 26 compounds were identified, 7 of which have not previously been reported in UHT milk. Gas chromatographic profiles indicated that 2-pentanone, 2-heptanone, 2-nonanone, and n-hexanal increased most in concn. during storage. The rate of increase in odd carbon-numbered methyl ketones (C3-13) was dependent upon storage temp., whereas the rate of increase in aldehydes was dependent upon both O₂ content and temp. of storage. Although methyl ketones were the most abundant class of compounds, aldehydes appeared to be most important in contributing to the off-flavour of stored UHT milk. AS

35

Tetra Pak's new system for the hydrolysis of ultra-sterilized, aseptically filled milk.

Nermark, C.

World Galaxy No. 7, 71-74 (undated) [5 ref. En] [Tetra Pak International, Lund, Sweden]

See FSTA (1978) 10 9P1298.

36

Aseptic spring at Gasti.

Hansen, R.

World Galaxy No. 7, 46-48, 50 (undated) [En]

See FSTA (1978) 10 12P2583.

37

[Heat treatment of cultured products. Aseptic technology and packaging.] Hitzebehandlung von fermentierter Milch; aseptische Technologie und Verpackung. [Lecture]

Puhan, Z.

XX International Dairy Congress, Conferences

Conferences 8ST, 18pp. (1978) [17 ref. De] [Lab. für Milchwissenschaft, Eidgenössische Tech. Hochschule, Eisgasse 8. 8004 Zürich, Switzerland]

The production of good quality cultured milk products (plain or fruit yoghurt, quarg) with extended shelf life is discussed, with particular reference to heat treatment to destroy contaminants, denature milk proteins and improve structure; protein, fat and sugar contents; pH; stabilizers; and selected heat-resistant *Streptococcus thermophilus* and *Lactobacillus bulgaricus* organisms (to produce live yoghurt). The heated products may be packaged aseptically, or hot-filled prior to cooling. A fresh product should not, by excessive heat treatment, be in danger of being treated as a preserved product. [See FSTA (1979) 11 6P883.] ASe

38

[UHT treatment and aseptic packaging of milk and dairy products. Recent developments.] UHT-Erhitzung und aseptische Verpackung von Milch und Milchprodukten. Neue Fortschritte. [Lecture]

Damerow, G.

XX International Dairy Congress, Conferences

Conferences 7ST, 36pp. (1978) [5 ref. De] [Alfa-Laval Ind. GmbH, Wilhelm-Bergner-Strasse, D-2050 Glinde bei Hamburg, Federal Republic of Germany]

In 1977, about 40% of all the market milk consumed in the Federal Republic of Germany was UHT processed: the number of UHT plants was about 90, of which some 23 were of the direct-heating type and the rest were indirect units. Results of comparisons between direct and indirect UHT methods are given. Data are presented on the new indirect UHT plant, type Steritherm (Alfa-Laval), and on tests carried out with 3 models in capacities ranging from 4000 to 8000 L/h. Heat regeneration was 85-87% and steam requirements were 0.035-0.04 kg/kg product. [See FSTA (1979) 11 6P883.] FL

39

[Influence of processing on hygienic and nutritional value of milk and dairy foods.] [Lecture]

Blanc, B.

XX International Dairy Congress, Conferences

Conferences 20ST, 42pp. (1978) [30 ref. Fr] [Sta. Fed. Recherches Laitieres, CH-3097 Liebefeld, Berne, Switzerland]

Physical, chemical, microbiological, sensory, nutritional and physiological tests were made on raw,

pasteurized (15 s at 72°C or 20 s at 92°C), direct UHT treated (150°C for 2.3 s) and indirect UHT treated (141°C, 14 s above 100°C) milks. Monthly variations in contents of non-casein N, α -lactalbumin, β -lactoglobulin, free NH_3 , tryptophan, total amino acids and vitamins, and in chemical score, biological value and enzyme activities (amylase, peroxidase and xanthine oxidase) are presented in numerous graphs and tables. Effects of storage at 5° and 25°C on the chemical composition and physical properties of direct and indirect UHT treated milks were also studied and results are presented graphically. [See FSTA (1979) 11 6P883.] MEG

40

[Criteria of requirements for high-performance filling techniques in the eighties - aseptic filling of liquid milk.] Anforderungskriterien an die Hochleistungsabfülltechnik der 80er Jahre - Aseptische Abfüllung von Konsummilch.

Kessler, H. G.

Molkerei-Zeitung Welt der Milch 32 (50) 1607-1609 (1978) [De]

Criteria for aseptic filling of UHT milk in the 1980's are discussed against the background of marked increases during the last 10 yr of UHT milk production, numbers of producers and UHT plant capacity in the Federal Republic of Germany; and of increases in costs. It is concluded that UHT milk fillers should be capable of packaging large quantities with the min. personnel, and with easy change in package vol.; that machines should work reliably with little servicing; and that packaging of UHT products should be in sterile, light-imperious materials capable of sterile sealing without admission of foreign substances to the contents. SKK

41

Sterile milk developments.

Anon.

Dairy Industries International 44 (3) 50 (1979) [En]

The new Elecster plant (Elecster Oy, Finland) for producing UHT milk (capacity 800-8000 L/h) uses electricity for raising the product temp. to 140°C. It incorporates a dried milk mixing station and an aseptic sachet filling unit, but may be connected to any existing aseptic packaging machine. A method for controlling the sterility of aseptically packaged UHT milk without opening or damaging the package is outlined. FL

42

[International meeting on UHT milk.]Italy, Societa Italiana di Scienza dell'Alimentazione
Latte 4 (1) 877-880 (1979) [It]

Summaries are given of the following 6 papers given at this meeting held on 23-24 Nov. 1978 at the Istituto Superiore di Sanita, Rome: Effect of processing of dairy products on their hygienic and nutritive values, by B. Blanc (p. 877); Microbiology of the production of UHT milk, by G. Giolitti (pp. 877-878); Problems of the processing, aseptic packaging, control and storage of UHT milk, by O. Cerf (pp. 878-879); Comparison of direct and indirect UHT-sterilization, by H. Burton (p. 879); Effect of technological treatments on nutritional properties, by L. Arrigo & E. Tiscornia

(pp. 879-880); and Influence of technological parameters on the organoleptic and nutritive properties of UHT milk, by E. Renner (p. 880). JMD

43

[Use of ionizing radiations in milk technology.]
[Review]

Morre, J.; Serres, L.; Janin, F.

Lait 58 (577) 381-389 (1978) [44 ref. Fr, en] [Lab. Cent. d'Hygiène Alimentaire, 43 Rue de Dantzig, 75015 Paris, France]

This review describes the types of irradiation that can be used for sterilization purposes, and outlines the effects that radiation treatment can have on liquid and dried milks, butter, cream, cheese, yoghurt, and casein and other milk proteins. Beneficial effects of sterilization without heat treatment are discussed; the main disadvantage of the method is that changes in colour, taste and smell of the treated product may occur. The use of irradiation for production of bacterial mutants with improved properties (such as greater acidification or proteolytic activity), for sterilization of enzymes (such as rennet and lipase) for measuring the density of a liquid product, and for sterilization of packages for UHT milk are also discussed. MEG

44

Sterile packaging.

Jarvis, A. S. (Drisan Packaging Ltd.)

United States Patent 4 112 124 (1978) [En]

A method is described of packaging food products in a substantially sterile condition which comprises the steps of placing the substantially sterile products in a container which is sufficiently flexible as to be deformed by a current of gas, and which is opaque to visible light radiation; displacing any atmospheric air that is on the surface of the product with a dry, sterile, inert gas; sealing the container while said gas is substantially the only agent contacting the product; filling the container; and after the atmospheric air has been displaced, irradiating the product with sterilizing UV lamp radiation. IFT

45

[Sterilizable packaging.]

Toyo Seikan Co. Ltd.

Japanese Examined Patent 5 331 437 (1978) [Ja]

Food packaging material which can be sterilized at high temp. is described which consists of a laminated sheet having a polypropylene inner layer and heat resistant synthetic resin outer layer, optionally separated by an O₂ impermeable layer. IFT

46

[Filling fruit juices and nectars into cartonboard containers.] Zur Kartonabfüllung von Fruchtsäften und Nektaren.

Anon.

Flüssiges Obst 45 (12) 446-448 (1978) [De]

The Tetrabrik aseptic system for packaging fruit juices and nectars is described with the aid of diagrams and its advantages claimed in relation to product quality, low cost and versatility are discussed. RM

47

[Sensory and chemical changes during storage of sterilized milks. I. Sensory changes.] Sensorische und chemische Veränderungen während der Lagerung haltbarer Milchsornten. I. Sensorische Veränderungen. Schmidt, R.; Renner, E.

Lebensmittel-Wissenschaft und -Technologie 11 (5) 241-243 (1978) [15 ref. De, en] [Milchwirtschaftliche Abteilung der Justus-Liebig-Univ. Giessen, Bismarckstrasse 16, D-6300 Giessen, Federal Republic of Germany]

In storage trials with UHT milk, sterilized milk, and evaporated milk, changes in sensory quality were investigated at different storage temp. Samples of UHT milk and sterilized milk stored at 20°C showed sensory deviations after 3-6 wk, compared with milk samples stored at 4°C; storage in an incubator (38°C) partly produced such deviations after 1 wk. Evaporated milk showed taste alterations compared with the control samples after 3 months at 20°C or after 1 month at 38°C. In fat-reduced UHT milk (1.7% fat content) the sensory deviations occurred to a smaller degree. Production of UHT milk by an indirect procedure led to more unfavourable results during storage with respect to keeping and sensory quality than by a direct procedure. Storage of sterilized milk, packed in non-coloured glass bottles, in diffuse daylight causes a rapid decline in the quality of the milk. AS

48

[Sensory and chemical changes during storage of sterilized milks. II. Chemical changes.] Sensorische und chemische Veränderungen während der Lagerung haltbarer Milchsornten. II. Chemische Veränderungen. Schmidt, R.; Renner, E.

Lebensmittel-Wissenschaft und -Technologie 11 (5) 244-248 (1978) [15 ref. De, en] [Milchwirtschaftliche Abteilung der Justus-Liebig-Univ. Giessen, Bismarckstrasse 16, D-6300 Giessen, Federal Republic of Germany]

During storage (≤ 1 yr approx.) of sterilized milks (UHT, sterilized or evaporated milk), the following chemical changes could be observed. Changes in the pattern of fatty acids in the triglycerides were small; contents of oleic and linoleic acids decreased slightly only at higher storage temp. Total content of free fatty acids (FFA) changed at refrigerator temp. only slightly, while storage at 20°C for 2-3 months and at 38°C for a shorter time led to higher FFA values. The pattern of FFA was not very different from that of the triglycerides. In the incubator at 38°C there was a decrease in the % short-chain FFA (C6-C12) after a long storage period. Changes in the total content of short-chain FFA during storage were similar to those of the total content of FFA. There was no observable influence of light on the content of FFA and hydroxymethylfurfural (HMF). Values of FFA and HMF were connected with sensory quality changes. A difference of 20-25% in the content of these compounds caused detectable sensory changes. [See preceding abstr. for part I.] AS

49

[Determination of vitamin C in UHT milk by direct evaluation of the thin-layer chromatogram.]

Bestimmung von Vitamin C in H-Milch durch Direktauswertung der DS-Chromatogramms. Matthiessen, E.

Deutsche Lebensmittel-Rundschau 74 (11) 403-407 (1978) [11 ref. De, en, fr] [Inst. für Lebensmittelchemie, Univ. Stuttgart, Federal Republic of Germany]

A method is described in which ascorbic acid (AA) and dehydroascorbic acid (DAA), after oxidation of AA with dichlorophenol-indophenol, are converted to the bis-2,4-dinitrophenylhydrazone of DAA. This is cleaned up on a silica gel column and separated by TLC from interfering substances. The red spot of the hydrazone is directly evaluated at 500 nm with a chromatogram spectrophotometer. For each TLC plate used, a calibration curve is determined by measuring hydrazone in this way in 4 standard concn. of AA. The method can detect 0.2 mg/l. As an example of its use, decreases in AA and DAA measured in UHT milk stored for 84 days at 20°C (without a headspace) are plotted. ADL

50

Liaison between universities and the dairy industry in America.

Speck, M. L.

Dairy Industries International 44 (3) 11, 13 (1979) [En]

The subject is discussed with particular reference to 2 recent examples of industry-university collaboration in dairy research, i.e. UHT processing and the development of sweet acidophilus milk. FL

51

[Method for improving the shelf-life of fresh milk during bottling or packaging.] Verfahren zur Erhöhung der Haltbarkeit von Frischmilch bei deren Abfüllen bzw. Verpacken.

Jentsch, H. G.

German Federal Republic Patent Application 2 619 073 (1977) [De]

Fresh milk is pasteurized by rapid heating to approx. 105°C (thereby killing all pathogenic bacteria) and further heating at 70-85°C, and then, at this temp. and in a sterile atmosphere, it is filled into heat-stable gas-tight plastics containers. Immediately after sealing, the containers are cooled in several stages to about 60°C and then to the desired storage temp. W&Co

52

[Proteolysis in UHT-sterilized milk.]

Snoeren, T. H. M.; Evers, P. H. J.

Voedingsmiddelentechnologie 11 (39) 13-15 (1978) [9 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See FSTA (1978) 10 6P751.

53

[Aseptic processing and packaging.] Aseptisches Prozessieren und Packen.

Green, J.

Industrielle Obst- und Gemüseverwertung 63 (18) 493-495 (1978) [De] [R & D Div., H. J. Heinz Co. Ltd., Hayes, Middx., UK]

Sensory, nutritive and economic aspects of aseptic processing and packaging (APP) are surveyed. Contrary to a widely held belief, APP does not have to be combined with UHT sterilization. Tabulated results show that APP entails smaller ascorbic acid losses and Zn uptake in canned products, without the drawback of increased Pb uptake (associated with interior lacquering). For cooked dishes, e.g. meat in gravy, APP can be combined with separate UHT sterilization of some ingredients. RM

54

[The new family of Pure Pak filling machines.]

Anon.

Nordisk Mejeriindustri 6 (1) 12-13, 15 (1979) [Sv]

Details are given of the new range of Pure-Pak packaging machines, models 120, 125, 220, 225, 230, 320, 420 and 520. They cover all types and sizes of Pure-Pak, from 0.125-0.3 l. (models 120 and 125) to 4 l. (model 420). Model 520 is for aseptic packaging. About 80% of components are common to the entire range. This gives considerable savings and simplifies servicing. The Accufiller system used on all models guarantees accurate, drip-free and hygienic filling. Model 220, shown in a detailed diagram, has a capacity of 7500 packages/h (0.2-1.0 l.) but can be used in pairs; it is then known as Model 225 and has twice this capacity. Conventional gas heating is normally used for top sealing, but ultrasonics can also be used. The machine can produce both gable-top and Flat-Pak packages. ADL

55

[Folding carton for aseptic packaging of liquids, such as milk.] Faltschachteln für steril zu verpackende Flüssigkeiten wie Milch.

Papier- und Kunststoff-Werke Linnich GmbH

German Federal Republic Patent Application 2 721 390 (1978) [De]

The carton is so constructed that there are no gaps between the overlapping fold seams in which sterilizing liquid can collect and remain trapped after it is discharged. The gaps are sealed by coating with plastics film. W&Co

56

[Production in France of long-life milks; characteristics and trends.]

Anon.

Technique Laitiere No. 928, 15-17 (1979) [Fr]

Results of a survey among 73 French dairies which were producing long-life milk (total output 1175 million l.) in 1976 are tabulated and discussed. Almost all (70) of the dairies produced long-life milk in semi-skimmed form, while 63 produced it as whole milk and 54 as skim-milk (71, 22.9 and 6.1% of total output, resp.). Non-flavoured UHT milk constituted 52.6% of total output, flavoured UHT milk 0.5%, non-flavoured sterilized milk 45.7%, and flavoured sterilized milk 1.2%. Sterilized milk was the main type among long-life whole milk and skim-milk (60.6 and 54.8% of output, resp.), but UHT milk accounted for the bulk (58.2%) of the long-life milk in semi-skimmed form. Examination of more recent data, for 1977 and 1978, revealed that by mid-1978 UHT

milk had increased its share of the liquid milk market to 28.3%, while the market share of pasteurized milk had fallen below 40%. Total output of long-life milk (1347 million l. in 1977) rose 17% in early 1978, with an increase of 29% for UHT milk but only 2% for sterilized milk. ADL

57

[Hygiene of UHT milk production.]

Giolitti, G.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 431-436 (1978) [13 ref. It]

This paper, which discusses hygienic aspects of UHT milk production and mentions the FAO/WHO, International Dairy Federation and Italian standards on this subject, is one of the papers from the international meeting on UHT milk sponsored by the Italian Food Science Society (Societa Italiana di Scienza dell'Alimentazione) in conjunction with the Italian section of the IDF. Most of this issue of the journal (pp. 419-504) is devoted to the meeting, which was held at the Istituto Superiore di Sanita, Rome, on 23-24 Nov. 1978. [See following 5 abstracts for other papers from the same meeting.] ADL

58

[Direct and indirect heating methods for UHT sterilization - a considered comparison.]

Burton, H.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 437-444 (1978) [9 ref. It] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The various types of UHT processing plant available are described, with diagrams, and comparisons are made between direct and indirect methods of processing, with particular regard to effects on spore counts, whey proteins, heat-labile vitamins, sediment formation during storage, clotting rate, loss of ascorbic and folic acids, and flavour changes during storage. Detailed experimental data are presented. It is pointed out that direct processing with expansion cooling causes O₂ removal, which has beneficial effects on stability of ascorbic and folic acids in storage but also results in poorer initial flavour. This disadvantage is considered acceptable, however, as the flavour improves after about 2 wk when the influence of -SH groups diminishes. Direct and indirect UHT sterilizers are also compared from the technological and economic points of view. The overall conclusion is that the choice of system depends on each particular case, as the greater first costs and running costs of a direct system must be set against the problems of deposit formation in the indirect methods. ADL

59

[Effect of technological processes on the hygienic and nutritive value of dairy products.]

Blanc, B.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 445-474 (1978) [30 ref. It] [Federal Dairy Res. Sta., CH-3097 Liebefeld, Berne, Switzerland]

The author points out that, despite the extensive literature on heat treatment of milk, few workers have attempted to make a detailed comparison of the properties of raw milk with the properties of the same milk after heat treatment. The author's own work, which forms the basis of this wide-ranging review, is designed to fill this gap in the research. It involves a multidisciplinary programme in which physical, chemical, microbiological, hygienic, organoleptic and physiological factors are taken into account in evaluating the effects of the following types of heat treatment: pasteurization for 15 s at 72°C; pasteurization for 20 s at 92°C; direct UHT sterilization for 2.3 s at 150°C; and indirect UHT sterilization for 14 s at > 100°C, with a peak temp. of 141°C. Effects of the different types of heat treatment on casein, whey protein and non-protein N fractions, free SH groups, casein micelles, free fatty acids, sediment formation, clotting, surface tension, viscosity, O₂ saturation, microbiological and nutritional quality, etc., are shown in numerous graphs and tables. Month-by-month seasonal variations in the properties of both the raw and the heat-treated milks are plotted, as well as changes observed during storage at 5° or 25°C. An interesting phenomenon which has come to light during trials with human volunteers is that UHT milk has a marked effect on blood leucocyte patterns within 1 h after ingestion. The possible nutritional and physiological significance of this effect, which is quite different from the effects of raw or pasteurized milk, is being studied. ADL

60

[Relationship between technological treatment and nutritional properties of milk.]

Arrigo, L.; Tiscornia, E.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 475-492 (1978) [132 ref. It] [Istituto di Fisiologia Umana, Univ., Genoa, Italy]

This paper reviews the effects of processing (especially UHT) on the different systems of which milk is made up, viz.: the micellar system (casein) and the colloidal system (whey proteins) in the disperse phase; the water-soluble system, which includes lactose, N compounds, vitamins and minerals; and the emulsion system, which embraces the fat globules and the fat-soluble vitamins. Differences between pasteurization, in-bottle sterilization and UHT treatment, with regard to their effects on the nutritional properties of milk, are pointed out. It is emphasized that UHT treatment is less detrimental to the nutritional quality of milk than is in-bottle sterilization, which reduces the digestibility and biological value of casein, severely denatures the whey proteins, favours Maillard reactions, destroys important vitamins and makes the fats more resistant to enzymic digestion. The comprehensive review of the literature covers not only the effects of heat treatment but also the effects of mechanical treatments such as homogenization, which, it has been suggested, may play a role in atherogenesis. ADL

61

[Current difficulties in the treatment, aseptic packaging, testing and storage of UHT milk.] Cerf, O.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 493-498 (1978) [5 ref. It] [INRA, 78350 Jouy-en-Josas, France]

The theoretical principles of physical or chemical sterilization are explained, with examples of the use of mathematical formulae involving the concept of decimal reduction time. The element of risk entailed in any sterilization procedure is pointed out - not only risks of microbiological origin (survival of resistant organisms) but also risks due to technical faults in equipment. Statistical aspects of testing the efficacy of sterilization are discussed, as well as microbiological aspects. An example is given of a testing scheme applied to UHT milk, involving tests by the manufacturer on 1% of output, before distribution, and spot checks on 10 packages in every batch retained. Finally, the question of storage life of UHT milk is considered, with particular regard to bacterial proteinases and lipases which are not inactivated by heat treatment. ADL

62

[Effect of differences in technology on the organoleptic and nutritive quality of UHT milk.] Renner, E.

Rivista della Societa Italiana di Scienza dell'Alimentazione 7 (6) 499-504 (1978) [7 ref. It] [Dep. of Dairy Sci., Justus-Liebig Univ., Giessen, Federal Republic of Germany]

The author points out that direct UHT processing has less effect on milk quality than indirect UHT treatment, which entails greater thermal stress because heating and cooling times are longer. The thermal stress values of 3 direct and 6 indirect UHT processes employed in the Federal Republic of Germany are compared, and effects of UHT processes on flavour are discussed in the light of the author's experimental results. It is shown that flavour of direct-UHT milk is relatively similar to the flavour of pasteurized milk and superior to that of indirect-UHT milk. The differences in quality between direct and indirect UHT milk are due not only to thermal stress but also to O₂ removal in direct UHT processes. Because O₂ is removed, direct UHT milk retains ascorbic acid much better during storage. The author's experiments have shown that organoleptic quality and ascorbic acid retention in indirect UHT milk can be improved by including a deaeration phase in the UHT process. Direct UHT milk must be packaged without a headspace, as otherwise O₂ content increases from <1 to 4 p.p.m. and ascorbic acid is destroyed within about 3 wk. Discussing storage temp., the author points out that lipolysis by bacterial lipases is much more marked at ambient temp. than at refrigerator temp.; indirect UHT milk with 3.5% fat showed marked flavour changes within 4 wk at 20°C, but no such changes occurred in indirect UHT milk with 1.5% fat or in direct UHT milk with 1.5 or 3.5% fat. The need for further improvements in flavour of UHT milk is stressed. ADL

63

Proteolytic activity in ultra-pasteurized, aseptically packaged whipping cream.

Richter, R. L.; Schmidt, R. H.; Smith, K. L.; Mull, L. E.; Henry, S. L.

Journal of Food Protection 42 (1) 43-45 (1979) [8 ref. En] [Dep. of Dairy Sci., Univ. of Florida, Gainesville, Florida 32611, USA]

The proteolytic activity in 3 commercial ultra-pasteurized, aseptically packaged samples of cream that developed bitter flavour was studied. Samples were analysed for microorganisms and rate of proteolysis as affected by reaction temp. and pH. The temp. effect was determined at 20°, 30°, 37°, 45° and 50°C. Samples A and B had an optimum temp. of 37°C for proteolytic activity while sample C had its optimum between 30° and 37°C. Sample B had increased activity at pH 7.0, 8.0 and 9.0. Sample A had increased activity between pH 7.0 and 7.5, while sample C exhibited greatest activity at pH 8.0. The rate of proteolysis increased with incubation time. AS

64

[Production of yoghurt and of long-life yoghurt.] Dellaglio, F.

Latte 2 (9) 531-534; (12) 707 (1977) [It]

The production of yoghurt is briefly described, including an account of the Frau 'LL' system in which milk is homogenized at 200 atm pressure at 60°C, heated at 90°C for 20 min, incubated with yoghurt organisms to a pH of 3.9-4.0, cooled to 20-25°C, stirred by pumping, and heated at 70°C for 30-40 s before aseptic packaging at 55-60°C. The laminated containers consist of polystyrene (outside)/Saran/PVC, with an inner layer of polyethylene or polypropylene. [Errata including an amended diagram are given on p. 707.] JMD

65

The Combibloc story.

Hansen, R.

World Galaxy No. 7, 83 (undated) [En]

The Combibloc fully aseptic filling machine is briefly discussed. The machine is available in 3 sizes for filling resp. 5000 1-l. cartons/h, 10 000 1-l. or 0.5-1. cartons/h, and 6000 0.2, 0.25 or 0.5-1. cartons/h. AGP

66

[The 'Bottle-Pack' system of aseptic filling and closure of fruit drinks in plastics bottles.]

Anon.

Bios 9 (3) 35-36 (1978) [Fr]

The system uses a single, compact machine to form the plastics container, then fill and close it aseptically; the process is completed in a few s and avoids the usual transport and storage of empty bottles, filling and sealing. Plastics granules are fed to the machine, and are extruded to form 1-6 parisons; these are cut off at the required length and blow moulded with filtered air to the final shape. The finished bottle is transferred aseptically to the filling section, where it receives an exact measured vol. of the beverage, and finally to the sealing head. Advantages claimed are: small floor space required; one person can supervise operation and

maintenance of several machines; different shapes and special designs are possible, with various easy opening and closing devices and either conventional labelling or engraving; and normal polyolefin plastics are used. Aseptic filling is achieved without use of a sterile room or the need for special precautions at the point of use. All processes are enclosed, the plastics container reaches 200°C and is thereby sterilized, the air supply is filtered and all parts which contact the product can be steam sterilized without dismantling. ELC

67

Rapid Canadian growth seen for aseptic systems.
Anon.

Food in Canada 39 (2) 14-16 (1979) [En]

Development and utilization in Canada of aseptic packaging systems is reviewed. Currently, those systems developed by Tetra Pak International AB dominate, and installations of these in dairy product and fruit juice plants are briefly described. JRR

68

[KMK Kassel developed a new packaging system for milk.] KMK Kassel entwickelte neues Verpackungssystem für Milch.
Anon.

Deutsche Milchwirtschaft 30 (9) 276 (1979) [De]

The system (not described) is for aseptic packaging of milk in 5-l. polyethylene jugs with screw-on closures, optionally provided with a dispensing attachment. It is considered that the containers are particularly suitable for use in creches and kindergarten. FL

69

Hamba now controls both wet and dry aseptic (low-germ) filling of plastic cups.

Anon.

World Galaxy No. 7, 121 (undated) [En]

The Hamba cup filling machine BK 6005/5 with UV-C lamps and a capacity of 18 000 units/h is described. The use of UV lamps with a spectral intensity of 200 mW/cm² is shown to kill 99.99% of moulds and bacterial spores and bacteria in general with 2 s irradiation. This machine can be used to achieve results close to fully aseptic and thus fill products with longer shelf life. AGP

70

Proteolysis during the storage of UHT-sterilized whole milk. I. Experiments with milk heated by the direct system for 4 seconds at 142°C.

Snoeren, T. H. M.; Spek, C. A. van der; Dekker, R.; Both, P.

Netherlands Milk and Dairy Journal 33 (1) 31-39 (1979) [28 ref. En] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Direct heating at 142°C for 4 s was insufficient to inactivate the native milk protease and the protease produced by psychrotrophic bacteria. Prolonged storage of directly heated UHT-treated milk therefore leads to coagulation of the protein system. The behaviour of the coagulum and the time of coagulation depend very much on the bacteriological quality of the

milk. Addition of Na₂HPO₄ or sodium hexametaphosphate at 50 g/100 kg did not affect the enzymic attack. AS

71

[Determination of lactulose in commercial milks.]
Martinez Castro, I.; Olano, A.

Revista Espanola de Lecheria No. 110, 213-217 (1978) [11 ref. Es, fr] [Inst. de Productos Lacteos del CSIC Arganda del Rey, Madrid, Spain]

Different types of milk were analysed for lactulose by GLC, after isolation of free sugars by dialysis and conversion to trimethylsilyl derivatives with trimethylsilyl imidazole [see FSTA (1970) 2 11P1509 & (1978) 10 8P1144]. Average lactulose contents found (as % of total disaccharides) were: 0.1 (range 0.08-0.3) in 6 pasteurized milk samples, including 2 conc. milk samples; 0.2 (0.05-0.6) in 8 dried milks; 0.3 (0.2-0.6) in 4 UHT milks; 2.9 (1.9-4.0) in 10 sterilized milks, including 2 evaporated milks; and 4.1 (1.9-5.0) in 4 humanized milks (one from the Arganda del Rey Dairy Products Institute, Madrid, and the others from the UK). The conventional sterilized milks also contained an unidentified disaccharide, with a retention time of 0.71 relative to α -lactose (similar to the retention time of a substance formed during treatment of cheese whey permeate with ion exchange resins). ADL

72

Volatile compounds in UHT-sterilized milk during fluorescent light exposure and storage in the dark.
Mehta, R. S.; Bassette, R.

Journal of Food Protection 42 (3) 256-258 (1979) [8 ref. En] [Dep. of Anim. Sci. & Ind., Kansas State Univ., Manhattan, Kansas 66506, USA]

When UHT sterilized milk (140°C for 3.5 s) was exposed to fluorescent light over a 30-day period at 22°C, acetaldehyde, propanal, pentanal, and hexanal increased in concn. On storage of the milk in the dark, after a 2-wk period of light exposure, these same compounds decreased in concn. No characteristic patterns were noticed in the other chromatographic peaks. When a 5 × diluted distillate of light-exposed milk was added to normal milk, a taste-panel criticized the milk as strongly oxidized, tallowy or oily. AS

73

UHT milk successful in Canada.

Anon.

American Dairy Review 41 (1) 22-24, 26 (1979) [En]

UHT milk was introduced into the North America market in 1975 and captured 20% of the liquid milk market in the areas it served in the first 2 yr with a 2% butterfat product. A 30% annual growth rate has been achieved since and exports now account for 20% of total sales. In Canada distribution costs of UHT milk are 65-85% of those for pasteurized milk. Free-choice acceptance of UHT milk shows that there is no flavour problem. The milk is packaged in Tetra Brik cartons, and growing success in Canada suggests that this packaging system will have a profound effect on the future of the dairy industry. AGP

74

[Metering device for metering and filling products under sterile conditions.] Dosiervorrichtung zum keimfreien Abmessen und Abfüllen von flüssigem Gut. Vögele, G. (Robert Bosch GmbH)

German Federal Republic Patent Application
2 658 147 (1978) [De]

Individual portions of liquids such as milk and other dairy products are metered and filled into containers by a metering device which comprises several juxtaposed metering pumps each having a piston in a horizontal cylinder with a valve. At the rear of the metering pumps is an extended chamber permitting retraction of the pistons. This chamber communicates with the upper part of a liquid supply chamber as well as with a filling chamber by fixed ducts. Sterile gas is introduced into the inter-communicating chambers at one location and a sterile atmosphere is maintained at a slightly higher pressure than atmospheric. Prior to commencing the metering and filling operation, all surfaces are first rinsed with a cleansing solution and then sterilized with steam while the pistons are in the retracted position. W&Co

75

Palm Dairies' \$multi-million processing plant is first UHT facility in W. Canada.

Macnab, I.

Modern Dairy 58 (1) 10-15 (1979) [En]

Utilizing the latest technology, Canada's newest dairy plant in South Edmonton is one of the most modern hygienic plants in North America. The plant of 100 000 ft² on 3 levels is capable of processing 750 000 lb product/8-h day. UHT 2% milk, UHT chocolate milk and UHT cream are processed and filled in an aseptic filling area totally enclosed in glass and fed with filtered air at positive pressure. Process functions are controlled and monitored from a master panel using a relay logic system. A flow chart showing the movement of milk through various processing stages is given. Energy conservation was a major concern in the design of the systems, and a 600 V 3 phase electrical supply was used to reduce costs. The plant also manufactures cheese, butter and cultured products. AGP

76

Considering UHT - what keeps it out of the U.S.?

Degner, R. L.

Dairy and Ice Cream Field 162 (2) 50, 52, 54, 73 (1979)
[En][Food & Resource Economics Dep., Univ. of Florida, Florida, USA]

The history of UHT processing of liquid milk and other dairy products which has been investigated for approx. a quarter of century, is described. The changing energy situation in the USA may soon make refrigerated distribution systems a luxury and provide the incentive for UHT to make an impact. It is suggested that there are 3 major barriers to adaption of the UHT process. The first pertains to the product itself, the organoleptic and nutritional properties, packaging and overriding consumer attitudes. A second major barrier is the present legal framework under which

liquid milk and dairy products are regulated. Thirdly there are very important economic barriers confronting the dairy-processing industry and dairy-distribution system. AGP

77

The influence of heat treatment of milk on starter activity: what about UHT?

Feldstein, F. J.; Westhoff, D. C.

Cultured Dairy Products Journal 14 (2) 11-15 (1979)
[26 ref. En][Dep. of Dairy Sci., Univ. of Maryland, College Park, Maryland 20742, USA]

UHT sterilization systems may render milk unsuitable for use in manufactured products. Current research into this problem is described and summarized in a table of selected literature comparing the effect of various heat treatments on milk and starter culture activity. It is suggested that UHT milk is a potential substrate for starter cultures in the manufacture of cultured dairy products, but that many other factors are involved in quality determinations. Further research is needed to determine the causes of variations in culture activity in heated milk substrates. AGP

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Titles of the FABs now available are given on the back cover of this booklet. For up-to-date lists of FABs or suggestions for new topics please write to the address on the back cover. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each months abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

Some of the larger FABs have been divided into sections to facilitate use. FAB 47 also has a subject and author index provided.

Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES
EDITOR

1

Method for aseptic packaging of high acid food.

Brody, A. L.; Archibald, W. E. (Mead Corp.)

United States Patent 4 152 464 (1979) [En]

A method is described for the aseptic packaging of high acid foods in which O₂ barrier plastics cups are heated in sterilizing water prior to filling with pre-sterilized food products having a pH of <4.6, and sealed with sterile cover elements; the process is carried out in an atm of sterile inert gas. IFT

2

[Enzymic spoilage in pasteurized and sterilized milk products. I. Proteolysis.]

Driessen, F. M.; Stadhouders, J.

Voedingsmiddelentechnologie 12 (8) 35-37 (1979)

[8 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See FSTA (1979) 11 4P552.

3

[Packaging of pasteurized milk: an official report.]

Anon.

Emballages 49 (361) 58-60, 63 (1979) [Fr]

Consumption of pasteurized milk in France has decreased since 1971 while that of UHT milk has increased. Packaging and distribution costs for pasteurized, sterilized and UHT milks in France are discussed, and a comparison made of the total energy required (including farm refrigeration, transport from the farm, manufacture of packaging material, processing and packaging of the milk, distribution, and retail refrigeration) to produce 1000 l. pasteurized, sterilized or UHT milk. Pasteurized milk in Tetra Pak cartons required the lowest amount of energy (854 thermies/1000 l. vs. 1240 and 1507 thermies for UHT and sterilized milks resp.). MEG

4

The effect of process parameters and storage temperature on the fat soluble alkanals, acid degree value and dissolved oxygen content during storage of UHT milk.

Earley, R. R.; Hansen, A. P.

Journal of Dairy Science 62 (suppl. 1) 41 (1979) [En]

[N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Raw whole milk was standardized to 3.25% fat, UHT processed at 2 different temp., aseptically packaged and stored at 24° or 40°C for 6 months. Methanal, propanal, butanal, nonanal and several longer chain alkanals were identified in both UHT samples immediately after processing, but decreased during storage. Acid degree values increased linearly with storage time and were dependent on temp. of UHT treatment and storage. Dissolved O₂ content increased with time at 24°C but decreased at 40°C. DMK

5

Apparent thermostability of penicillin G in water and milk.

Feldstein, F. J.; Dougherty, S. L.; Westhoff, D. C.

Journal of Dairy Science 62 (suppl. 1) 42 (1979) [En]

[Univ. of Maryland, College Park, Maryland 20742, USA]

Raw milk or water containing 10 or 100 IU penicillin G/ml were heated in sealed glass vials at 110-140°C. No loss of inhibitory activity was demonstrated in the milk after 5 h of heating. Thus, residual penicillin G activity in milk would be inactivated by UHT processing. DMK

6

Denaturation of bovine serum albumin in ultra high temperature processed milks and model systems.

Weissler, N. L.; Mangino, M. E.

Journal of Dairy Science 62 (suppl. 1) 229 (1979) [En]

[Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

The fused rocket antibody technique showed that apparent concn. of serum albumin (SA) in milk increased following mild heat treatments and for some time/temp. combinations of UHT heat treatments. In 1 case, processed milk had an apparent SA concn. that was 151% of the raw milk. In model systems containing SA in various salt systems, with selected whey and casein proteins, at <74°C or in saline solutions denaturation of SA followed 1st order kinetics. In most complex salt systems or with added proteins or lipid or at higher temp. the denaturation could not be described by 1st or 2nd order reactions. DMK

7

The effect of ultra high temperature processing on the proteins of whole milk.

Morgan, J. N.; Mangino, M. E.

Journal of Dairy Science 62 (suppl. 1) 229 (1979) [En]

[Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

Milk was preheated to 65.6°, 73.9° or 82.2°C and then processed by steam injection at 1 of 5 temp. between 137.8° and 154.4°C for 1.5, 3.4 or 9 s. Heat treatment resulted in a large decrease in centrifugal whey N while the ratio of sulphhydryl groups to proteins in the casein fraction increased. At the highest levels of heat treatment, whey N and sulphhydryl levels began to increase. Electrophoresis indicated that casein was being solubilized. DMK

8

Trained taste panel evaluation of UHT steam injected fluid dairy products subjected to varied process and storage conditions.

Hansen, A. P.; Swartzel, K. R.

Journal of Dairy Science 62 (suppl. 1) 60-61 (1979)

[En] [N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Milks of 0.5-10.5% fat were sterilized by direct UHT treatment at 138-149°C for 3.4-20.3 s, and assessed

during storage at 4°, 24° or 40°C for up to 48 wk. Scores were good, and increased during storage at 4°C, but declined rapidly at 40°C. Gelation occurred at 24°C with UHT treatment at 149°C for 3.4 or 6.9 s. Samples with 0.5% fat had the lowest scores. JMD

9

Optical density of UHT dairy products as a tool for quality assurance.

Swartzel, K. R.; Hansen, A. P.; McClure, W. F. *Journal of Dairy Science* 62 (suppl. 1) 61 (1979) [En] [N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Direct optical density (OD) measurements were made at 470 and 720 nm on UHT-sterilized milks and cream with 0.5–10.5% fat, sterilized at 138–149°C for 3.4–20.3 s and stored for 0–60 wk. An empirical relationship was established between taste panel data, ΔOD , % fat and storage time, that allows an accurate prediction of taste panel ratings of UHT dairy products. JMD

10

The behavior of lactic starter cultures in ultra-high temperature processed milk.

Dougherty, S. L.; Feldstein, F. J.; Ousley, R. S.; Westhoff, D. C.

Journal of Dairy Science 62 (suppl. 1) 67 (1979) [En] [Univ. of Maryland, College Park, Maryland 20742, USA]

The growth of commercial starter cultures in UHT-treated milk processed at 137.7–154.4°C for 1–9 s was compared with that in pasteurized or 11% dried skim milk when incubated for 12 h at 30° or 40°C. A significant increase in activity of yoghurt cultures was observed in sterilized milk compared with pasteurized milk, but not in any cheese cultures. ASe

11

[Hygiene of UHT milk production.]

Giolitti, G.

Mondo del Latte 33 (3) 157–162 (1979) [13 ref. It]

Pasteurization remains the best method of milk treatment in urban centres where the population is not so large as to create problems in distribution, and where there is a satisfactory refrigeration chain. In other cases, however, UHT treatment is considered preferable. The problem of bacteriological contamination of milk after UHT treatment is discussed, and methods of UHT treatment are briefly described, including a new method of heating by mechanical friction (based on the principle that a liquid passing between 2 rapidly moving surfaces undergoes a rapid increase in pressure and temp.). The problem of heat-resistant bacterial proteinases is mentioned; these enzymes may cause bitter flavour and gelling in UHT milk, but the time/temp. combinations needed for their inactivation cause chemical changes in the milk. Details are given of international and Italian standards for testing of UHT milk. Finally, the various types of containers used for aseptic packaging are discussed. ADL

12

Sensoric changes in UHT milk during uncooled storage.

Mottar, J.; Waes, G.; Moermans, R.; Naudts, M. *Milchwissenschaft* 34 (5) 257–262 (1979) [17 ref. En, de] [Gov. Sta. for Res. in Dairying, Melle, Belgium]

A total of 20 samples from 6 UHT treatment lines (2 indirect and 4 direct) were tested organoleptically during storage in the dark at 20°C. Mean whey protein denaturation of 68.1 and 53.3% was observed in indirect and direct heated milks resp., however, keeping quality of the former was, in general, better than that of the latter. Most samples showed deterioration in flavour after storage for > 8 wk. Loss of flavour during storage was related to heating intensity of the milk ($P < 0.01$), protein degradation ($P < 0.001$), and fat degradation ($P < 0.001$), but not to dissolved O_2 or to products of the Maillard reaction. CDP

13

[Effect of heat treatment on the storage life of milk.]
Corradini, C.

Quaderni del Comitato della FIL-IDF No. 1, 19–34 (1978) [32 ref. It] [Dipartimento per Ricerche Lattiero-Casearia, Univ. Cattolico del Sacro Cuore, Piacenza, Italy]

The author reviews the effects of heat treatment on the colloidal dispersion of proteins in milk, and gives details of his own results as evidence to support his interpretation of the phenomenon of gel formation in heat-treated milk. Factors which influence the shelf life of sterilized (especially UHT) milk are then discussed in the light of experimental data obtained by subjecting milk to different levels of UHT treatment in Stematic Long-Run plants. It is shown that the shelf life of UHT milk (i.e. the period during which it remains free from gelling) is directly related to the formation of complex casein micelles: thus, the higher the level of casein N as % of total N, the longer the shelf life. The number of complex micelles formed, and the stability of the bonds within them, increases in direct proportion to the severity of heat treatment. Other methods of prolonging shelf life may well be preferable to severe heat treatment, however, especially for consumers who are accustomed to pasteurized milk. The author has found that the shelf life of UHT milk can be greatly extended if care is taken to avoid high temp. and exposure to the sun. This is demonstrated by comparison of the levels of casein N (as % of total N) in UHT milk stored for 4 months at ambient temp. and at 30°C. Extension of shelf life well beyond 6 months is considered feasible. ADL

14

[Aseptic packaging and the agricultural and food industries.]

France, Association pour la Promotion Industrie Agriculture (APRIA)

Industries Alimentaires et Agricoles 96 (2) 111–121 (1979) [Fr]

Summaries are given of the following lectures delivered at an APRIA meeting on 15 Nov., 1978 under

the auspices of the 2nd International Exhibition of Food Industry Engineering (GIA). Principles of aseptic packaging, by G. Odet (pp. 111-112). Materials for aseptic packaging of milk, by D. Cerf (pp. 113-115). Aseptic packaging in metal cans, by L. Michiels (pp. 115-116). Aseptic packaging of beverages, by B. Deymie (pp. 117-121). RM

15

[Plastics containers for UHT products: 'bottle-pack-aseptic-system'.] Kunststoffbehälter für UHT-Produkte: 'bottle-pack-aseptic-system'.

Anon.

Molkereitechnik 43 73-75 (1979) [De]

The containers (polyethylene) are made by a blow-moulding process and are filled immediately whilst still sterile. The packaging plant can be supplied direct from the UHT installation or via a sterile tank; for capacities of up to 1000 l/h the company supplies their own indirect UHT sterilizer with an integrated cleaning system. The smallest packages are tubes with 7.5 or 15 ml coffee cream. Further package sizes are 200-250 ml for school milk, 0.5 and 1.0 l bottles, and finally 5 and 10 l containers (for catering establishments, schools, bakeries, confectionery shops). FL

16

[A 200-L "can".]

Anon.

Emballages 49 (362) 86, 88, 90 (1979) [Fr]

A Portuguese-made (Van Leer company), 208-l reusable drum, called the Asepton, is being used for packaging heat-sterilized (HTST) liquid and semi-liquid foods, such as tomato or fruit concentrates. An illustrated description is given of the pneumatic sealing process for the non-plasticized PVC-lined steel drum, which can be filled aseptically with subsequent rapid cooling. Potential applications include pastes, pulps, beverages, sauces and dairy products. HBr

17

[New development in aseptic packaging in a food packaging line.]

Anon.

Imballaggio 30 (281) 96-99 (1979) [It]

The firm of Erca have developed the NAS (Neutral Aseptic System) packaging system, claimed to retain the bacteriological, nutritive and sensory properties of the packaged food. The materials used are coextruded laminates of polyethylene (PE)/polypropylene (PP)/polystyrene, with and without PVDC, in which the PE/PP layers are delaminable for subsequent thermoforming to a rigid cup-like base and for use as a lid. A series of schematic diagrams is given of the packaging machine. Particular attention is given to presterilization of the machine. HBr

18

[Multiplies, the Belgian example.]

Anon.

Emballages 49 (362) 100-101 (1979) [Fr]

The Belgian firm of Cobelplast are using a series of

flexible multiply films for packaging various foods. These include: UHT milk in a container made (from outside to inside) of pigmented polystyrene (PS)/UV-barrier PS/PVDC/low-monomer PS (shelf life >6 months with aseptic filling); margarine in a container made of antistatic PS/polyethylene (PE)/low-monomer PS; fresh meat in a container of PS/PVDC/PE (with N₂ injection); and meat concentrate cubes in PS/PVDC/low-monomer PS. The firm are currently carrying out tests on sterilizable multiply packs. HBr

19

Some organoleptic, chemical and microbial changes in ultra-high-temperature sterilized milk stored at room and at refrigeration temperatures.

Mehta, R. S.

Dissertation Abstracts International, B 39(1) 148-149; Order no. 78-11430, 137pp. (1978) [En] [Kansas State Univ., Manhattan, Kansas 66506, USA]

UHT-treated milk (140°C for 3.5 s) was homogenized at 52°C and packaged in Al foil-lined or plain polyethylene (PE)-lined 1-pint cartons; 2 days later half of the cartons were further wrapped to exclude light and O₂ before exposure of all cartons to 2150 lux during storage at 22°C. During storage, stale flavour increased and cooked flavour decreased, but no significant browning, lipid oxidation or microbiological deterioration was observed. GLC analysis of volatile compounds showed a relationship between increase in stale flavour and increases in C3, C5 and C6 aldehydes; these increases were more marked in milk stored in glass Erlenmeyer flasks. Changes in cooked flavour were associated with changes in methyl sulphide. Packaging in Al foil-lined cartons or refrigeration in the dark helped to prolong good flavour. DMK

20

[Quality of UHT milk compared with pasteurized and in-bottle sterilized milks.]

Mottar, J.; Naudts, M.

Lait 59 (588) 476-488 (1979) [9 ref. Fr, en] [Sta. Laitiere de l'Etat, Melle, Belgium]

A comparison was made of the flavour, nutritive value and some physico-chemical properties of pasteurized, in-bottle sterilized and indirectly- and directly-heated UHT milks. The flavour of UHT milk, particularly that of indirectly-heated milk, was significantly different from that of pasteurized milk; and that of directly-heated UHT milk was significantly different from in-bottle sterilized milk. Mean losses of lysine were 2.0, 4.3, 6.5 and 11.3% in pasteurized, directly-heated UHT, indirectly-heated UHT and sterilized milks, resp. Mean losses of vitamin B₁₂, folic acid and vitamin C were <13% in pasteurized milk, 17-20% in directly-heated and 30-35% in indirectly-heated UHT milks, and 39-66.5% in sterilized milk. Pasteurization had only a slight effect on whey protein content whereas UHT treatment and sterilization resulted in a 50-77% reduction in whey proteins. Values for whey protein N index were 54.6, 71.4, 85.2 and 94.8 for pasteurized, directly-heated UHT, indirectly-heated UHT and sterilized milks, resp. It is concluded that the whey protein N index or a modified turbidity test (in

which measurements are made with a Fisher DRT-100 nephelometer) can be used to classify heat-treated milks. MEG

21

Electron microscope studies on gelation by UHT-treated milk during storage.

Farah, Z.

Lebensmittel-Wissenschaft und -Technologie 12 (3) 169-171 (1979) [8 ref. En] [Inst. de Nutricao UFPE, Caixa Postal 299, Recife 50 000 PE, Brazil]

The gelation process of UHT-heated milk (150°C/24 s) and autoclaved milk (116°C/17 min) was studied by electron microscopy. Both milks were canned and stored at 20°C, 33°C or 45°C. Gelation was observed in UHT-heated milk stored at 20°C after 36 wk and at 33°C after 30 wk. No gelation was observed in UHT-samples stored at 45°C for 45 wk or in autoclaved samples stored at 20°, 35° or 45°C. The reason for the gelation could not be explained, but it is suggested that it was due to residual proteolytic enzymes. AS

22

[Bacteriological control of UHT milk.] Die bakteriologische Kontrolle von H-Milch.

Kleeberger, A.; Busse, M.

Deutsche Milchwirtschaft 30 (37) 1337-1340, 1342 (1979) [4 ref. De]

A detailed account is given of various aspects and problems of quality control of UHT milk products, covering routine control (number of samples needed and pre-incubation, additional and bacteriological control tests for thermophilic bacteria); controls when large-scale disturbances occur in the production of UHT milk; and bacteriological tests (details of tests, detection of spore-forming bacteria, and mesophilic organisms). FL

23

[UHT plants from Holstein & Kappert.] H-Anlagen von Holstein & Kappert.

Anon.

Molkereitechnik 43, 39-40 (1979) [De]

The company manufactures 2 types of UHT plant differing only in the capacity; the smaller handles up to 4000 l/h and is intended mainly for school milk whilst the larger is for throughputs of up to 20 000 l/h. The plant is sterilized at $\geq 135^\circ\text{C}$ for 30 min before use. It comprises 2 heat exchangers where the product is pre-heated to 128°C for subsequent heating to $> 135^\circ\text{C}$, holding, and regenerative cooling to the filling temp. The plant may be cleaned during production runs; the pressure in the heater on reaching a certain level initiates the cleaning which is carried out at 140°C with the retention of sterile conditions. The processing may then be immediately resumed without another sterilization. The main cleaning is done at the end of each production run. FL

24

[Nuova Frau - an important development in UHT milk production.] Nuova Frau - eine bedeutende Entwicklung bei der H-Milch-Produktion.

Anon.

Molkereitechnik 43, 57-59 (1979) [De]

The UHT Steriflux plant of Nuova Frau, Vicenza, Italy employs the following process. The milk is pre-heated regeneratively to 75°C, is degassed and heated further (again regeneratively) to 121°C, is homogenized, and heated to the final temp. of 136-138°C by saturated steam flowing in counter-current. After regenerative cooling, the treated milk leaves the plant at 20°C for aseptic packaging or storage in sterile tanks. Advantages claimed include the possibility of processing high-viscosity products, continuous operation up to and over 20 h and high heat regeneration (82%). FL

25

[Production of UHT milk by the new Steritwin process.] Die Herstellung von H-Milch nach dem neuen Steritwin-Verfahren.

Anon.

Molkereitechnik 43, 53-56 (1979) [De]

A brief description is given of the Steritwin UHT sterilizer (Stork, Amsterdam), consisting essentially of an indirect heater, steam injector, flash-vessel deaerator, homogenizer, and control instruments. A feature is that the transition temp. between indirect heating and cooling on the one hand and direct steam injection with subsequent flash evaporation on the other may be set as required. Traditionally this temp. is about 80°C, but with the Steritwin higher temperatures, e.g. 110° or 130°C, may be chosen or the plant may be operated entirely by the indirect process. FL

26

[Test and technical evaluation of the Schmidt UHT installations 3000 and 4000/6000.] Prüfung und

technische Begutachtung der Schmidt-Ultrahocherhitzungsanlage 3000 und 4000/6000.

Kessler, H. C.; Horak, P.

Molkerei-Zeitung Welt der Milch 33 (17) 538-544

(1979) [De] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weihenstephan, Federal Republic of Germany]

The 2 indirect heating UHT installations with 3000 and 4000/6000 l/h capacity resp. manufactured by Firma W. Schmidt KG, Kühlerwerk, D-7518 Bretten/Baden, German Federal Republic are described in full detail and the flow diagram of the 3000 installation is presented. Both installations were tested under industrial conditions coupled resp. to Tetra-Pak type AB2-1000 and type AB3-1000 packaging machines. The processing cycle is described; results of tests involving vol. changes, product back-flow, water vapour back-flow, time/temp. relationships, construction, materials and finish, control and safety devices, cleaning, and sterilization are presented, as well as those of

bacteriological examination of products. In view of satisfactory findings on all aspects studied, no objections are raised to use of the installations for production of UHT milk. SKK

27

[Commercial sterilization of milk and similar products.]

Souza, G. de

Boletim do Instituto de Tecnologia de Alimentos, Brazil No. 57, 123-139 (1978) [10 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Sao Paulo, Brazil]

Milks with various flavours (chocolate, strawberry, vanilla, orange and banana) were produced by a process involving the following stages: heating at 65°C; homogenization at 180 kg/cm²; UHT sterilization for 4 s at 140°C; cooling to 65-70°C; 2nd homogenization at 50 kg/cm²; further cooling to 30°C; aseptic packaging in a Tetra Pak machine directly connected to a Stork-Sterideal sterilizer, using waxed paper lined with Al and polyethylene; and storage for 4 days at ambient temp. to get rid of cooked flavour. Results of physicochemical tests (pH; fat separation; gelling; coagulation; extraneous odour and flavour; sedimentation) on the milks after incubation for 14 days at 30°C, 10 days at 55°C or 90 days at ambient temp. are given, and conclusions drawn from the results are presented. Addition of sodium alginate and vanilla essence is considered essential for improving the viscosity and stability of chocolate milk. Homogenization did not adequately reduce the size of cocoa particles, and at pressures above 180 kg/cm² had the unwanted effect of increasing sedimentation, probably because of protein instability. Sedimentation was minimal, however, when sodium alginate was used together with very fine cocoa powder. ADL

28

[Requirement criteria for high-capacity filling techniques in the 80's.] Anforderungskriterien an die Hochleistungsabfülltechnik der 80er Jahre.

Kessler, H. G.

Molkereitechnik 43, 15-20 (1979) [De]

The expansion of UHT milk production in the Federal Republic of Germany over the past few years is illustrated in terms of annual sales, numbers of producing plants, and vol. of output/plant. Requirements for aseptic packaging machines are then dealt with, covering technical and operational aspects, versatility, reliability, etc. FL

29

[Chemical, technological and biochemical aspects of UHT milk production.] Chemisch-technologische und biochemische Aspekte zur H-Milch-Herstellung.

Reimerdes, E. H.; Diekmann, F. W.

Molkereitechnik 43, 5-14 (1979) [30 ref. De]

[Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

This review-type article deals with many aspects of UHT milk production, including legal regulations, heating methods, and effects of heating on destruction of microflora and on milk constituents (fat, proteins, lactose, minerals and vitamins.). FL

30

Food process.

Unilever Ltd.

British Patent 1 550 000 (1979) [En]

A process is described in which water-containing foods e.g. bread are aseptically packaged by placement in a film package impervious to gas and water vapour which has discrete pressure relieving vents, followed by heating to sterilization temp., first with the vents open, to prevent the package bursting and finally with them closed to seal the package. The package prevents formation of condensation and entry of microorganisms. SP

31

Reduction of cooked flavour in heated milk and milk products. (In 'Progress in flavour research' [see FSTA (1980) 12 4T194].) [Lecture]

Badings, H. T.

pp. 263-265 (1979) [2 ref. En] [Netherlands Inst. for Dairy Res., Ede, Netherlands]

A systematic study was made to determine whether the addition of small quantities of L-cystine prior to heating of milk and milk products greatly diminishes the cooked flavour defect of UHT milk, due to H₂S. Addition of 30-70 mg L-cystine/kg UHT milk heated at 141°C for 4.6 s in an Alfa-Laval plate-type indirect heating sterilizer, reduced the H₂S content and cooked flavour of milk compared to a control (without added L-cystine). Addition of 30-70 mg L-cystine/kg UHT milk heated directly also reduced cooked flavour and H₂S content of milk compared with a control. Intensive heat treatment of milk may cause a 'sterilization flavour' due to caramelization and Maillard reactions rather than H₂S content; therefore addition of L-cystine has only a very small effect on flavour defects. It is concluded that L-cystine is an effective agent against cooked flavour in heated milk. SP

32

[Changes in volatile sulphur compounds in UHT-sterilized milks during storage.]

Dumont, J.-P.; Adda, J.

Annales de Technologie Agricole 27 (2) 501-508 (1978) [18 ref. Fr, en] [Lab. de Tech. Laitiere, INRA, 78350 Jouy-en-Josas, France]

2 types of UHT-sterilized milk were prepared from the same raw milk: SM, standardized to 3.4% fat with indirect-heating in a Stork tubular heat exchanger; or US; standardized to 1.7% fat, with direct steam injection, Uperisation. The samples were stored under vacuum in litre cartons, outside in ambient, atmospheric shade conditions. Except for the raw control milk which was examined after 2-3 days, analyses for volatile S compounds were made every 7 days for 3 months by GLC with temp. programming from 10-110°C on a 6.4 m column, 2 mm internal diam., filled with Chromosorb G.A.W.DCMS (80/100 mesh) coated with 5% Igepal CO 630. Various samples of commercial pasteurized and sterilized milks in plastics and cartons were similarly examined on the day of purchase. More H₂S, > 250 µg/l was present during the 3 days after UHT treatment, but diminished rapidly during the 1st month of storage to < 50 µg/l after 2-3 months; levels of

H₂S were slightly higher in milk SM. No methanethiol was present in raw milk, but there were traces in the UHT milks. Dimethylsulphide, present in raw milk at 32 µg/l, decreased to a fairly constant level in milk SM of 11–16 µg/l and almost disappeared in UM with <0.3 µg/l. Dimethyldisulphide was present in all samples at 0.3–0.6 µg/l. Differences between the UHT milks and raw milk were considered to be sufficient to distinguish them using this type of GLC. SAB

33

[Some properties of a milk proteinase isolated from UHT milk.]

Snoeren, T. H. M.; Riel, J. A. M. van; Both, P. *Zuivelzucht* 72 (2) 42–43 (1980) [10 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

A proteolytic enzyme was successfully isolated from protein precipitated at pH 4.6 from UHT milk. The method employed involved isolation of a protein complex by static affinity chromatography, followed by fractionation on a positively charged DEAE-6B-Sephacrose column. As in a previous study [FSTA (1978) 10 6P751] the UHT milk was produced by direct steam injection for 4 s at 140°C. The milk was of excellent bacteriological quality, having been obtained under aseptic conditions. The protease split α_{s2} -casein and β -casein at equal rates, forming γ -casein (characteristic of milk proteinase) from the latter. The cleavage of the caseins was inhibited by heat-denatured β -lactoglobulin, but not by the native protein. This may explain why proteolysis is much less of a problem in indirect UHT milk (where 85% of the β -lactoglobulin is denatured) than in direct UHT milk (where only 40% is denatured). [See also FSTA (1979) 11 4P552.] ADL

34

Kinetic investigations of the hydrolysis of milk lactose with soluble *Kluyveromyces lactis* β -galactosidase.

Forsman, E.-S.; Heikonen, M.; Kiviniemi, L.; Kreula, M.; Linko, P. *Milchwissenschaft* 34 (10) 618–621 (1979) [20 ref. En, de] [Valio Lab., Kalevankatu 56 B, SF-00180 Helsinki 18, Finland]

A sample empirical static process model was developed for soluble *K. lactis* β -galactosidase (Maxilact 40 000) to estimate the time necessary for a given conversion of milk lactose. Both commercial UHT milk and pasteurized milk were used as substrates. Operating temp. for optimum hydrolysis of lactose varied with incubation time and enzyme concn., e.g. at an enzyme concn. of 300–400 mg/l it was 35°C for a 2-h hydrolysis and 20°C for a 4-h hydrolysis. A simple equation ($x = t/(a + bt)$, where x = % conversion, t = incubation time in h, and a and b are variables) was found to approximate well to hydrolysis data obtained. The model may be used to estimate processing conditions, such as time necessary to obtain a given hydrolysis of lactose at a certain temp. and enzyme concn. MEG

35

[Analysis of consumers' opinions and behaviour with regard to UHT milk in the Federal Republic of Germany.] Analyse der Verbrauchermeinung und des Verbraucherverhaltens bei H-Milch in der Bundesrepublik Deutschland. [Thesis]

Kess, U.

267 pp. (1979) [De] Giessen, Federal Republic of Germany; Justus-Liebig-Univ.

A survey in the Federal Republic of Germany involving >2000 interviews, revealed that milk had a generally positive image among consumers. The main qualities influencing the decision to buy milk were its health-giving properties, its freshness and its good flavour. Of the households that used milk, 48% regularly bought fresh milk and 39% UHT milk; 26% used only fresh milk and 29% only UHT milk. Those households which had tried UHT milk but not bought it again (12%) thought that UHT milk was inferior to fresh milk not only in flavour but also from the point of view of nutrition and health. Conversely, regular purchasers of UHT milk thought it superior to fresh milk both in flavour and in nutritive value. The decision to buy UHT milk was influenced mainly by its long storage life (4–6 wk), although in fact consumers did not keep UHT milk longer than 10 days on average. The low price of UHT milk had less influence on purchasers than might have been expected. Of the households using UHT milk, only 23% bought cocoa- or fruit-flavoured UHT milk beverages (mainly for children). As a drink, adults tended to prefer plain UHT milk to flavoured UHT milk. ADL

36

Expansion by Tetra Pak in UK.

Anon.

Dairy Industries International 45 (2) 17, 20–21 (1980) [En]

During 1979 several UK dairy companies launched flavoured UHT milk, and 200-ml cartons for packaging cream became firmly established. Similarly, the use of cartons for fruit juice, particularly long life, has been greatly expanded. A unit was designed which automatically attaches a straw to the 200 and 250 ml cartons at the same speed as the cartons are filled and sealed, and is reported to be widely used in Japan. FL

37

[Testing of Aseptic Tetra Standard (AT), Aseptic Brik 1 (AB1) and Aseptic Brik 3 (AB3) aseptic packaging installations manufactured by AB Tetra Pak, Lund (Sweden).] Typpröfung von aseptisch arbeitenden Verpackungsanlagen der Typen Aseptic Tetra Standard (AT), Aseptic Brik 1 (AB1) und Aseptic Brik 3 (AB3) Hersteller: AB Tetra Pak, Lund (Schweden).

Reuter, H.

Molkerei-Zeitung Welt der Milch 33 (25) 832–833 (1979) [1 ref. De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

This is an abridged version of the full report [see FSTA (1977) 9 11P1738].

38

Ultrahigh temperature heating system.

Wakeman, A. H. (Crepaco Inc.)

United States Patent 4 161 909 (1979) [En]

In a typical embodiment of the invention, milk, at 170°F, enters at the top of an upright chamber, descending through it at a predetermined flow rate and in a curtain-like pattern, the milk being intermixed with and heated by steam entering the chamber at 290°F, raising the milk temp. to 290°F. A pump connected to the chamber outlet is operated at such a capacity as to prevent accumulation of product and steam in the lower portion of the chamber. The discharge side of the pump is connected to an intermixing device causing all the steam entrained in the product to condense. On leaving the intermixing device, the mixture of the product, condensed steam and noncondensable gas enters a holding tube where it is retained for a predetermined time-temp. treatment whilst being maintained at a greater pressure than that within the chamber. The wt., temp. and pressure of the steam entering the chamber are maintained at constant levels by means of a control unit. EJM

39

[Retention of vitamins during UHT sterilization of milk.]

Uherova, R.; Görner, F.

Prumysl Potravin 30 (8) 445-447 (1979) [26 ref. Sk]

[Chemickotech. Fak., Slovenska Vysoka Skola Tech., Bratislava, Czechoslovakia]

Bulk milk, after pasteurization at 85°C with 5 s holding and storage, was sterilized at 140°C with 3-4 s holding by steam injection, immediately cooled evaporatively to 76°C, homogenized and aseptically packaged at about 20°C. Samples taken before the UHT treatment and at the exit from the aseptic packaging machine were examined for the contents of 7 vitamins. The results are tabulated separately for samples taken in May, Sept., March and July 1976/1977. The average % retention values after the UHT treatment were as follows: β -carotene, 93.9; vitamin A, 97.2; thiamin, 82.0; riboflavin, 97.6; nicotinic acid, 96.0; pantothenic acid, 96.4; and vitamin B₆, 92.7. It is concluded that the retentions are comparable to those for pasteurized milk. FL

40

Inactivation of milkborne foot-and-mouth disease virus at ultra-high temperatures.

Cunliffe, H. R.; Blackwell, J. H.; Dors, R.; Walker, J. S.

Journal of Food Protection 42 (2) 135-137 (1979)

[16 ref. En] [USDA, Plum Island Anim. Disease Cent., PO Box 848, Greenport, New York 11944, USA]

Milk from cows with foot-and-mouth disease containing 10^{37} to 10^{64} plaque-forming units of virus/ml was exposed to several UHT treatments for 2-5 s. Results indicated that the virus in such milk could be reliably inactivated when held at 148°C for 3 s or longer. AS

41

[Bacterial spoilage of UHT treated milk - a review.]

[Review]

Mostert, J. F.; Holzapfel, W. H.

South African Journal of Dairy Technology 11 (3) 93-

99 (1979) [74 ref. Af, en] [Navorsingsinst. vir Vee- en

Suiwelkunde, Irene 1675, South Africa]

This review considers the types of microorganisms causing spoilage, effect of bacterial proteolytic and lipolytic enzymes on keeping quality of UHT milk, and measures that may be taken to prevent spoilage. MEG

42

Isolation, identification and practical properties of *Bacillus* species from UHT and sterilized milk.

Mostert, J. F.; Lück, H.; Husmann, R. A.

South African Journal of Dairy Technology 11 (3)

125-132 (1979) [28 ref. En, af] [Anim. & Dairy Sci. Res.

Inst., Irene 1675, South Africa]

148 samples of sterilized milk (in-bottle process), 169 UHT-treated milk samples and 207 samples of UHT-treated dairy desserts were examined bacteriologically after incubation at 30°C for up to 14 days, or at 55°C for up to 7 days. 110 out of 220 organisms isolated from the products were identified as *Bacillus* spp., the main spp. isolated from sterilized milk being *B. cereus*, *B. licheniformis* and *B. pumilus*, and from UHT-treated products the same 3 spp. + *B. subtilis*. 38 of the isolated *Bacillus* spp. had biochemical reactions differing from those of the designated species to which they were assigned (e.g. some strains could grow at higher temp., others differed with respect to sugar fermentation patterns, hydrolysis of starch, decomposition of casein and growth in 7% NaCl and anaerobic agar). 4 of 26 isolates from UHT milk, and 3 of 12 isolates from UHT desserts survived heat treatment at 135°C for 10 s; and 2 of 16 isolates from sterilized milk survived heat treatment at 110°C for 15 min. 8 *B. subtilis*, 7 *B. licheniformis*, 2 *B. cereus* and 2 *B. pumilus* strains showed proteolytic activity during incubation at 7°C on milk agar. 28 of the *Bacillus* spp. caused visible spoilage within 3 wk of inoculation into sterilized milk and incubation at 7°C. The ability of these organisms to grow at 7°C and the heat resistance of the spores are important aspects of potential spoilage of UHT and sterilized milks. Isolates other than *Bacillus* spp. found in UHT and sterilized milks were mainly *Corynebacterium*, *Microbacterium*, *Micrococcus* and *Clostridium* spp. MEG

43

[Influence of technological variants on the quality of UHT milk.] Einfluss technologischer Varianten auf die Qualität der UHT-Milch. [Thesis]

Töter, D.

117pp. (1979) [many ref. De] Giessen, Federal Republic of Germany; Justus-Liebig-Univ.

UHT milk produced by different methods was kept for 6 months at different temp. Organoleptic quality was generally better in milk produced by direct UHT treatment than in milk produced by the indirect method. Pasteurization before UHT treatment resulted in lower

levels of free fatty acids and better flavour. Flavour of indirect UHT milk was better (and its free fatty acids and O₂ contents were lower) if homogenization was carried out after UHT treatment, rather than before. Removal of gas from indirect UHT milk was only effective if O₂ content was reduced below 1 p.p.m. and the milk was then packaged without a headspace. The O₂ content was higher, and ascorbic acid was destroyed more rapidly, if milk passed through a sterile tank after UHT treatment instead of being packaged immediately. The different methods of UHT treatment had no significant effects on hydroxymethylfurfural, lysine and tocopherol contents. Organoleptic and chemical properties of UHT milk were generally better with storage at low temp. (4°C) than with storage at room temp. (20°C). Samples stored at high temp. (38°C) showed distinct changes after only 2 wk. ADL

44

[Market analysis of different kinds of packaging of pasteurized and UHT milk in Federal Republic of Germany.] Marktanalyse der verschiedenen Verpackungsarten von pasteurisierter und ultrahocherhitzter Konsummilch in der Bundesrepublik Deutschland. Longuet, D.

Molkerei-Zeitung Welt der Milch 33 (19) 615-616, 618, 620-623 (1979) [1 ref. De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany.]

This survey, analogous to that for 1975 and similarly presented [see FSTA (1977) 9 5F179], is based on replies to questionnaires received in 1976 and 1977 resp. from 74 and 77 enterprises producing pasteurized milk, and 33 and 40 producing UHT milk. The results for 1976 and 1977 are compared with those for 1969 and 1972 and are also analysed by region. Cartons retained their dominant position in pasteurized milk packaging, with 65.3% of the market in 1976 and 66.1% in 1977; plastics packaging accounted for 33.3% in both yr. For UHT milk, TetraBrik was dominant with 89.8% of the market in 1976 and 89.4% in 1977. SKK

45

Cost, consumer appeal spur development of flexible, foil-laminate packages.

Peters, J. W.

Food Product Development 13 (11) 34, 36, 39 (1979) [En]

Sun-Rype Products of Kelowna, British Columbia has adopted the European Brik Pak aseptic packaging system for its juices. This could yield a 40% saving in container costs but requires a \$1.4 million capital investment for new packaging equipment and facilities. Brik Pak containers utilize a poly/foil/paper packaging material that is formed into a brick-shaped carton in an aseptic filling system. The 1 l container replaces a packaging mix that includes 5.5-, 10- and 48-oz cans for juice. Sun-Rype is aiming at an 8-month shelf life for the apple juice. Shasta Beverages has adopted another European packaging development by producing under licence from Deutsch-SiSi Werke, The Capri-Sun line of apple, orange and lemonade fruit drinks. Packaging is a free-standing, gusseted pouch that holds 200 ml of the 10% juice product. The material is a

poly/foil/polyolefin laminate. Consideration is also given to the integrity of foil laminates for packaging powdered alcoholic cocktails and to the development of a liquid salad dressing concentrate in a laminated pouch. VJG

46

Aseptic canning process keys shelf-stable custard line.

Ranieri, S.

Food Product Development 13 (11) 32, 39 (1979) [En]

A description is given of the manufacture of the aseptically packaged 'Thank you' brand of egg custard by Michigan Fruit Cannery. The product is made with fresh egg yolks and thickened with carrageenan, xanthan gum, and locust bean gum. Other ingredients are skim milk, water, partially hydrogenated soybean oil, mono- and diglycerides, disodium phosphate, salt, artificial flavouring and riboflavin and annatto colour. Key considerations in developing an acceptable egg custard include pretreating the egg yolks to avoid curdling and utilizing the steam infusion cooking system. The line is to be extended by the introduction of 4 new flavour var. VJG

47

[Continuous sterilization and pasteurization of fruit and vegetable juices.]

Troyan, Z. A.; Kizilova, L. A.; Red'ko, A. G.

Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 8, 26-28 (1979) [Ru] [Krasnodarskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, Krasnodar, USSR]

Continuous sterilization processes for fruit and vegetable juices with pulp, using HTST counter-current equipment were studied. Sterilization of apricot, sour cherry, plum and tomato juices was studied between 1973-1978. The juices were filled into 3 l bottles. Results of juice analysis prior to sterilization, after sterilization and after 6 months of storage are given in a table. The method recommended proved to be suitable and superior to sterilization in autoclaves. STI

48

In-line membrane filtration units.

Low, P.; Newton, R.

Journal of the Institute of Brewing 85 (6) 323-324 (1979) [En] [Cape Hill Brewery, PO Box 27, Birmingham B16 0PQ, UK]

Microbiological counts obtained from commercial cellulose ester membrane discs, used to sample sterile packaging beer lines, have been found to differ from counts obtained for packaged beer. Performance of the membrane filters was found to vary in use, without damage of the membrane, although no problems were experienced with the units used in a laboratory in a vacuum system. Users of the units should be aware of the problem of leaks, possibly associated with variable packaging line pressures. DIH

49

[UHT treatment of milk. I. Bacteriological and physicochemical aspects, nutritive value and quality control of UHT milk and sterilized milk.]

Mostert, J. F.

South African Journal of Dairy Technology 11 (2) 61-64 (1979) [4 ref. Af] [Navorsingsinst. vir Vee- & Suiwelkunde, 1675 Irene, South Africa]

This article (No. 27 in a series of educational articles) points out the differences between UHT milk and conventional sterilized milk. The definitions of both types of milk, in practice, are based on keeping quality, which is tested by the procedures laid down in IDF Standard 48:1969. Bacteriological problems which may occur in the milk after heat treatment are discussed, in particular the problem of heat-resistant proteolytic and lipolytic enzymes produced by psychrotrophic bacteria, and the problem of bacterial spores that survive UHT treatment. The effects of UHT treatment on the chemical composition, colour, odour, flavour, texture, structure and nutritive value of milk are then considered, and finally details are given of the keeping quality tests prescribed in the IDF Standard, together with details of the modified Aschaffenburg turbidity test which is used to differentiate UHT milk from conventional sterilized milk. ADL

50

[Methods for the manufacture of sterilized and UHT milk.]

Downes, T. E. H.

South African Journal of Dairy Technology 11 (3) 107-110 (1979) [1 ref. Af] [Navorsingsinst. vir Vee- & Suiwelkunde, Irene 1675, South Africa]

This is No. 28 in the series of educational articles mentioned in the preceding abstr. It describes the various processes of sterilization in the order in which they were developed, viz. sterilization in the container, continuous-flow sterilization by the direct UHT (Uperisation) process, and sterilization by indirect UHT treatment. The equipment used for these processes is shown in diagrams, and methods employed for packaging of UHT milk are described. The article ends with a brief reference to quality control procedures. ADL

51

Duration of the pre-incubation period in the sterility control of UHT-sterilized milk.

Langeveld, L. P. M.; Bolle, A. C.

Netherlands Milk and Dairy Journal 33 (4) 172-180 (1979) [7 ref. En] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

28 strains of microorganisms inoculated at levels of about 10, 1 and 0.1 viable cells or spores/10 ml UHT milk, were incubated at 30°C. Cell concn. had to increase from 1 cell or spore/10 ml to about 10^4 - 10^5 /ml for a positive streak to be obtained on Plate Count Agar + 0.1% dried skim milk. The min. pre-incubation period required, after which no further positive streaks appeared in sets of 5 tubes, ranged from ≤ 3 to > 8 days. Since too long a pre-incubation time might result in microorganisms dying off, the recommended duration

of pre-incubation for UHT-treated milk is 7-9 days at 30°C, followed by streaking on plates and incubating for 4 days at 30°C. CDP

52

Effects of different temperatures and holding-times on whey protein denaturation in a UHT pilot-plant.

Agrawala, S. P.; Reuter, H.

Milchwissenschaft 34 (12) 735-737 (1979) [10 ref. En, de] [Inst. für Verfahrenstech., Bundesanstalt für Milhforschung, Kiel, Federal Republic of Germany]

Raw whole milk was processed in an experimental indirect coil-type UHT plant (Stork mini-sterideal). Effects of pretreatment at 60-90°C for holding times of 2.8-407 s followed by UHT treatment at 120-160°C for 2.5-36.9 s on whey protein denaturation were studied. The % denaturation varied linearly with preheating temp. when plotted against log holding time, but 2 values varied according to the amount of denaturation: e.g. at 10, 20, 30, 40 and 50% denaturation, z values were 10.6, 11.8, 12.8, 13.6 and 14.4, resp. The different z values are attributed to denaturation of individual whey proteins. The z values were not significantly different in milks held at 70°C for 2.8, 57, 157 and 407 s, but decreased when milk was held for 406 s at increasing temp. (70°, 80° and 90°C). In order to reduce the formation of deposits in the UHT plant, milk is given a preliminary heat treatment to denature 50-60% of whey proteins. MEG

53

Effect of ultra-high-temperature steam injection on sulfur-containing amino acids of skim milk.

Hurrell, R. F.; Deutsch, R.; Finot, P. A.

Journal of Dairy Science 63 (2) 298-300 (1980) [14 ref. En] [Res. Dep., Nestle Products Tech. Assistance Co. Ltd., PO Box 88, CH-1814 La Tour-de-Peilz, Switzerland]

Neither methionine and cystine contents nor protein efficiency ratio of raw skim milk were reduced when it was UHT processed for 5, 10 or 20 s at 150°C. These results contrast with reported losses of 34% for both methionine and cystine [FSTA (1978) 10 2P172], but are consistent with rat assays which indicated no reduction in the nutritive value of milk proteins by this process [see FSTA (1973) 5 3P374]. AS

54

Effect of temperature and time of processing and storage on consumer acceptability of ultra-high-temperature steam injected whole milk.

Hansen, A. P.; Swartzel, K. R.; Giesbrecht, F. G.

Journal of Dairy Science 63 (2) 187-192 (1980) [19 ref. En] [N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Whole milk (3.25% fat and 12.0% TS) was processed in a UHT steam injection system. All samples were preheated to 78°C. Process time-temp. relationships included 138°, 143°, and 149°C for 20.3 s; 143° and 149°C for 6.9 s; and 149°C for 3.4 s. The product was stored at 4°, 24°, or 40°C and evaluated by an untrained taste panel at intervals of 0, 4, 8, 12, 16, 20 and 24 wk. Flavour scores for samples stored at 4°C generally increased

with time, while scores of samples stored at 40°C declined with time. Prediction curves indicated that product flavour scores improved as storage temp. decreased to < 12°C for [process treatment at 149°C and] a mean residence time of 3.4 s, to < 32.5°C for 20.3 s, and 12–32.5°C for intermediate heat treatments. Acceptable flavour scores for milk stored for 20 wk at or near room temp. were produced by UHT steam injection and aseptic packaging. AS

55

Sterilization process.

IN DA TE AG

British Patent 1 558 013 (1979) [En]

A process is described for food sterilization and preservation which employs steam injection, cooling and packaging under maintained aseptic conditions. IFT

56

Inactivation of heat resistant bacterial proteases in ultra-high temperature treated milk.

Adams, D. M., Jr.; Barach, J. T.; Speck, M. L. (United States of America, Research Triangle Institute)

United States Patent 4 175 141 (1979) [En]

It is claimed that flavour defects may be decreased, and storage life prolonged, in UHT sterilized milk by destroying the heat-resistant proteases in the milk. This is achieved by subjecting the milk to a low temp. inactivation process involving holding milk at preferably 50–60°C for 5–60 min immediately before or after UHT treatment at $\geq 120^\circ\text{C}$. EJM

57

Specification for ultra heat treated or UHT milk.

Malaysia, Standards & Industrial Research Institute of Malaysia

Malaysian Standard MS 8.17, 11 pp. (1976) [En] Price M\$1.30 [PO Box 35, Shah Alam, Selangor, Malaysia]

Milk should be UHT-sterilized at $\geq 132^\circ\text{C}$ for ≥ 1 s followed by aseptic packaging. Min. composition is 3.25% fat and 8.50% SNF. Coliforms should be absent in 0.1 ml milk, total colony count < 10/0.1 ml milk, and the pH should not decrease by > 0.2 on incubation for 5 days. Requirements for packaging, sampling and testing are specified. JMD

58

Specification for ultra heat treated or UHT reconstituted milk.

Malaysia, Standards & Industrial Research Institute of Malaysia

Malaysian Standard MS 8.18, 11 pp. (1976) [En] Price M\$1.30 [PO Box 35, Shah Alam, Selangor, Malaysia]

The reconstituted whole milk must be made exclusively from milk constituents, plus necessary, approved food additives, and be UHT-sterilized at $\geq 132^\circ\text{C}$ for ≥ 1 s followed by aseptic packaging. Other requirements are as for UHT milk (see preceding abstr.) except that the name of the product is UHT reconstituted milk or Reconstituted ultra heat treated milk. JMD

59

Specification for dry-salted ikan kurau (threadfin).

Malaysia, Standards Institution of Malaysia

Malaysian Standard MS 3.55:1975, 17 pp. (1975) [En] [PO Box 544, Kuala Lumpur, Malaysia]

Requirements for dry-salted ikan kurau (threadfin fish) (*Polynemus indicus*) of 3 sizes (> 5, 3–5, and < 3 kg) include: moisture content, $\leq 40\%$ by wt.; NaCl, $\geq 25.0\%$; and acid-insoluble ash, $\leq 1.5\%$. AL

60

[Preservation process.]

Teikoku Sanso Co. Ltd.

Japanese Examined Patent 5 502 271 (1980) [Ja]

Food is hermetically sealed in bags containing a gaseous atm of Ar and CO₂ to prevent spoilage by mould growth. IFT

61

Modified aseptic processing system could offer 75 percent energy saving.

Anon.

Food Product Development 13 (7) 52–53 (1979) [En]

The Dole 540 canning line, a unit capable of handling cans ranging from 202 by 300 in size and holding 4½ oz of product to 404 by 700 cans holding 46 oz of product, is modified by using hot air rather than steam to sterilize containers and the filler section. This unit, in conjunction with high temp./short time processing equipment, handles pumpable products such as puddings, soups or sauces containing particles up to ⅛ in cube. Calculations are presented for energy usage by steam sterilization and by hot air sterilization. The energy usage calculates to 593 BTU/can for the retorted product and to as little as 150 BTU/can for the system using hot air sterilization. This shows an energy reduction of almost 75%. VJG

62

[Removal of bacteria from materials for aseptic packaging. III. Treatments of preformed blanks for UHT packaging by spraying with concentrated hydrogen peroxide solutions.]

Entkeimen von Packstoffen beim aseptischen Abpacken. III. Untersuchungen zur Entkeimung vorgefertigter H-Milchverpackungen durch Eindüsen von konzentrierten Wasserstoffperoxidlösungen. Huber, J.

Verpackungs-Rundschau 30 (5, Techn. Wiss. Beil.) 33–37 (1979) [11 ref. De, en] [Fraunhofer-Inst. für Lebensmitteltech. & Verpackung, Inst. Tech. Univ., Munich, Federal Republic of Germany]

An electro-pneumatic experimental installation consisting of a spray and a drying section was used to obtain optimum conditions for the removal of bacteria from 1 l UHT packaging blanks using an H₂O₂ spraying system. The optimum quantity of a 30% H₂O₂ solution was 0.22 ml/pack followed by drying with hot air at 180°C. Although the spray only partially moistened the packages, a death rate of 6 log cycles for *Bacillus subtilis* spores could be obtained. This indicates that the action of H₂O₂ only takes full effect after the injection of hot air. IN

63

[Method and equipment for UHT pasteurization of fruit juices and other liquid products.]

Sukovaty, J.

Czechoslovak Patent 193 239 (1979) [Cs]

Gas-free liquid is passed under pressure into a continuous UHT pasteurizer provided with a diffuser with jet orifices arranged tangentially to ensure contact between pure steam and the liquid under turbulent movement; the pasteurization temp. of 150–200°C is reached in a very short time by use of vacuum or possible reduction of liquid pressure. Volatile substances formed in the vapour may be rectified in an enclosed circuit using supplementary equipment; they are then recirculated in the form of an aroma concentrate to the UHT-pasteurized liquid, which is pumped to the cooler unit. STI

64

[Trends in dairy research. I. Quality.]

Juarez, M.; Ramos, M.; Olano, A.

Alimentaria No. 107, 19–21, 23, 25–27, 29–31, 33–34 (1979) [32 ref. Es] [Inst. de Productos Lacteos, CSIC, Arganda del Rey, Madrid, Spain]

Current research relating to quality of dairy products is reviewed, with particular regard to the composition and properties of milk, the effects of technological processes on quality of dairy products, the problems of fat oxidation and lipolysis, the problem of gelling in UHT milk, contamination of dairy products by residues of insecticides, antibiotics and heavy metals, the development of new analytical methods (for determining composition and microbiological quality, detecting adulteration, etc.) and the development of processes for manufacture of new or improved products. ADL

65

[Testing and appraisal of the 3000 and 4000/6000 Schmidt ultra-high temperature installation.] Prüfung und technische Begutachtung der Schmidt-Ultrahocherhitzungsanlage 3000 und 4000/6000.

Kessler, H. G.; Horak, P.

Molkereitechnik 43, 41–52 (1979) [De]

At the request of the manufacturers, W. Schmidt KG in Bretten/Baden (Federal Republic of Germany), their 3000 UHT installation was tested in the Gropper dairy in Bissingen in conjunction with a Tetra Pak AB2-1000 machine; and their 4000/6000 ultra-high temp. installation was tested on the Adam Albert dairy farm in Schesslitz in conjunction with a Tetra-Pak AB3-1000 machine. Both installations and the tests carried out are described in detail with a flow diagram of operation and particulars of milk processing, and sterilization and cleaning of equipment. It is concluded that the installations satisfied all technical criteria, and bacteriological and hygiene requirements, and no objections are raised to their use for production of UHT milk. SKK

66

[Staphylococci were the cause of UHT milk poisoning.] Staphylokokken waren die Ursache für die H-Milch-Vergiftung.

Anon.

Deutsche Milchwirtschaft 30 (43) 1600 (1979) [De]

Some 40 people in Schwäbisch Hall (Federal Republic of Germany) who had drunk UHT milk with a validity date of 5 Nov. 1979 suffered from food poisoning requiring hospital treatment. Pathogenic staphylococci have since been detected in UHT milk packages from the Hohenloher Molkerei eG dairy in Schwäbisch Hall, and the outbreak is ascribed to staphylococcal toxin formed in the milk. The contamination was probably brought in by a carrier member of the dairy staff, but its source remains unknown; stringent tests and examination have not disclosed any personnel or machinery shortcomings. The effects of the mishap on production and sale of UHT milk are discussed. It is pointed out that the annual world production of UHT milk is 10 000 million packages and that such contamination had not previously occurred. SKK

67

[Some properties of milk proteinase isolated from UHT milk.]

Snoeren, T. H. M.; Riel, J. A. M. van; Both, P.

Voedingsmiddelentechnologie 12 (26) 26–28 (1979) [10 ref. Nl] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See FSTA (1980) 12 5P940.

68

[Study of protein quality of UHT milk.]

Untersuchungen zur Eiweissqualität.

Renner, E.; Dorguth, H.

Deutsche Milchwirtschaft 31 (14) 505–506, 508 (1980) [14 ref. De] [Milchwirtschaftliche Abteilung der Justus-Liebig-Universität, Gießen, Federal Republic of Germany]

51 samples of UHT milk (with 1.5% fat) obtained from 44 manufacturers (who were asked to supply the samples immediately after manufacture) in the German Federal Republic using 7 different makes of plant of the direct (14 samples) and indirect (37 samples) types were analysed. Mean contents (with ranges) of available lysine and hydroxymethylfurfural were resp.: direct-heated samples, 8.29 (7.1–9.4) g/100 g protein and 6.9 (4.3–10.4) µmol/l; and indirect-heated samples, 8.11 (6.7–9.1) g/100 g protein and 11.75 (6.0–21.4) µmol/l. Lysine losses averaged 4%, being somewhat higher for indirectly heated than directly heated samples. Average content of hydroxymethylfurfural was significantly increased in the samples processed by the indirect method, partly beyond the organoleptically noticeable threshold value. The negative correlation between the concn. of the 2 compounds in the milk was so low that the determination of hydroxymethylfurfural does not allow any reliable conclusions to be drawn on the extent of protein damage in UHT milk. It is concluded that commercial UHT milk has essentially the same protein quality as the initial milk. FL

69

Properties of caseins and whey proteins from UHT-treated, pasteurized and raw milks.

Douglas, F. W., Jr.; Greenberg, R.; Farrell, H. M., Jr.; Edmondson, L. F.

Abstracts of Papers, American Chemical Society 178 (1) AGFD 13 (1979) [En] [E. Reg. Res. Cent., SEA, USDA, Philadelphia, Pennsylvania 19118, USA]

UHT treatment of skim milk (148°C for 2.5 s) has been found necessary to destroy foot and mouth disease virus [see FSTA (1980) 12 6P1089]. To determine the effects of UHT treatment of milk proteins, their properties were compared with those of proteins from pasteurized (77°C for 15 s) and raw milks. Vacuum-dried/acid-precipitated caseins and freeze dried/dialysed whey proteins were prepared from each product. Available lysine levels were not significantly different for the 3 caseins. Whey proteins from UHT treated milk showed a small decrease (<10%) in available lysine. Gel electrophoresis showed that major caseins were present in all samples, although complexing of β -lactoglobulin with casein was indicated for UHT samples. A marked reduction in solubility of casein resulted from UHT treatment when determined at neutral pH or below; at pH 8.0 solubility approximated that of pasteurized and raw milk caseins. Emulsifying capacity was determined by dispensing corn oil into casein solutions with thorough stirring. At pH 6.8 the UHT casein emulsions did not form completely; however, when complete solution was effected by first adjusting the pH to 8.0, then lowering it to 6.8, the emulsifying capacity of UHT casein compared favourably with that of raw and pasteurized caseins at all concn. Thus, UHT treatment of skim milk resulted in alteration of the properties of the milk proteins. AS

70

Could UHT milk change the U.S. dairy industry?

Beck, R. L.; Hicks, C. L.

Hoard's Dairyman 125 (6) 437, 480 (1980) [En] [Dep. of Dairy Marketing, Univ. of Kentucky, Lexington, Kentucky 40506, USA].

In the USA there are only a few UHT processing units, mainly for research purposes. The cooked flavour of UHT milk poses more of a problem for the American consumer than it does in some areas of Europe, although there has been progress; the introduction of a larger container, for instance 4 l, is recommended to make consumer handling easier. The possibilities of cost reductions through eliminating refrigeration, and of benefits for dairy farmers if UHT milk became more popular, are discussed. BWH

71

UHT milk. A possible energy saver.

Anon.

American Dairy Review 42 (1) 12, 14 (1980) [En]

A brief account is given of studies carried out at the University of Maryland on energy consumption of sterilized milk production with figures for UHT milk in comparison to pasteurized milk. The UHT system required under the worst conditions 293 Btu/lb vs. 118

Btu/lb for pasteurized milk. It is emphasized that these figures do not take into account the potential for energy recovery or the adoption of further modifications to the sterilization system to save energy, and it is considered that if these were incorporated there would be little or no difference in energy consumption between the 2 milks. Further savings would be effected by the transport of UHT milk in unrefrigerated trucks, reduced deliveries, and storage without refrigeration. Finally, the DASI sterilizer is briefly described. FL

72

Milk processed at ultra-high-temperatures - a review. [Review]

Mehta, R. S.

Journal of Food Protection 43 (3) 212-225 (1980)

[112 ref. En] [Dep. of Anim. Sci. & Ind., Agric.

Experiment Sta., Kansas State Univ., Manhattan, Kansas 66506, USA]

UHT processing today may describe either a sterilization or a pasteurization process. This review primarily covers the sterilization process which involves heating milk at 130-150°C for ≥ 1 s and then packaging it aseptically. The main topics covered are: history, economics, and theoretical basis of UHT processing; common UHT processes and available aseptic packaging systems; microbial, nutritional, biochemical, and physical aspects of UHT milk; and flavour of UHT milk. AS

73

A progress report: new Canadian milk markets opened by aseptic milk.

Anon.

American Dairy Review 42 (3) 26, 28 (1980) [En]

Information is given on marketing of UHT milk in Tetra Brik by 2 Canadian dairy plants (Laiterie Cité, Quebec, and Palm Dairies, Edmonton). The former dairy has been achieving a consistent 10% annual increase in sales of its UHT product 'Grand Pré' launched in late 1975, with 75% of sales being new business; <25% of its conventional pasteurized milk sales have been replaced by UHT milk. Major and potential outlets are discussed. FL

74

[Continuous UHT sterilization of liquids containing particulate solids.] Zur Frage der kontinuierlichen UHT-Durchflussterilisation von Flüssigkeiten mit stückigen Teilchen.

Kessler, H. G.

Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik 31 (3) 124-127 (1980) [3 ref. De]

[Lehrstuhl für Lebensmittelverfahrenstech. & Molkereitech., Tech. Univ. München, 8050 Freising-Weihenstephan, Federal Republic of Germany]

After a brief discussion of continuous UHT sterilization of foods and its advantages, calculation of the required heating conditions (to give adequate heating of the centre of the solids) on the basis of the theory of non-stationary heat balance is described. Practical trials were conducted with potato pieces, peas, grapes and brass balls. Tables and graphs of results are

given, and discussed in detail. Technical limits to the feasibility of continuous UHT sterilization of liquids containing particulate solids are discussed, with reference to the interrelation of particle size, heating time and the heat conduction characteristics of the liquid medium; the required intensity of heat treatment also influences the feasibility of this process. AJDW

75

Method for automatic low-bacteria to aseptic filling and packing of foodstuffs employing ultraviolet radiation.

Bachmann, R.; Sturm, W. (Aluminiumwerke AG; BBC Brown Boveri & Co. Ltd.)

United States Patent 4 175 140 (1979) [En]

The automatic filling and packaging of foods under low-bacteria or aseptic conditions is achieved by disinfecting the packaging material for ≥ 1 s by high-intensity UV irradiation, generated from a high-current, low-pressure mercury discharge with a current of > 1 A/cm²; the spectral radiation intensity of the 253.7 nm line of the UV irradiation of the packaging material is set to ≥ 0.05 W/cm². The method is applicable particularly to the filling of portion-size beakers with products such as yoghurt or cream. EJM

76

[Comparative study of composition and physical properties of pasteurized and ultra-high-temperature treated whipping cream.] Vergleichende

Untersuchungen über Zusammensetzung und

physikalische Eigenschaften von pasteurisiertem und ultrahocherhitztem Schlagrahm.

Hänni, H.; Flückiger, E.; Eyer, H.

Schweizerische Milchzeitung 106 (16) 106-107 (1980) [14 ref. De]

10 samples of pasteurized (at 85-96°C) and 8 samples of UHT (at 140-150°C) whipping cream from different manufacturers were examined. The mean values for the 2 whipping creams resp. were total fat 35.35 and 35.10%, free at 0.132 and 0.088%, free fatty acids 0.207 and 0.195 (unit not stated), DM 40.03 and 40.96%, fat-free DM 5.68 and 5.86%, Ca 0.070 and 0.072%, total N 0.331 and 0.338%, casein N 0.284 and 0.298%, non-protein N 0.022 and 0.023%, whipping time (Mohr & Baur apparatus) 46 and 72 s, whipping time (hand whisk) 83 and 157 s, strength 11.3 and 10.8 mm, overrun 88.3 and 99.2%, drip 0.9 and 2.7 ml, pH 6.71 and 6.71, and titratable acidity 5.2° and 5.9°SH. It is concluded that the 2 whipping creams were virtually identical in composition, but that UHT cream was clearly inferior to pasteurized cream in whipping quality. The advisability of adding substances to UHT whipping cream to improve stability of the whipped product is discussed. SKK

77

Effect of heat-stable proteases on the storage life of UHT milk.

Richardson, B. C.; Newstead, D. F.

New Zealand Journal of Dairy Science and Technology 14 (3) 273-279 (1979) [10 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New

Zealand]

UHT milks, to which various concn. of heat-stable extracellular protease from *Pseudomonas fluorescens* B12 and B52 had been added, were stored at 30°C for ≤ 6 months. In the milks containing > 1 ng added protease/ml considerable proteolysis was evident after 3 months from measurement of non-protein N and analysis by gel electrophoresis. The major casein degradation products had similar electrophoretic mobilities to para- κ -casein and to the γ -caseins. It was concluded that UHT milks containing even these low concn. of similar heat-stable proteases may not have a storage life of > 3 months. AS

78

[Product distributor for aseptic canning lines.]

Fuks, E. I.; Tochilovskii, G. L.; Gaidarenko, V. E.;

Shapil'skii, M. Ya. (Union of Soviet Socialist Republics, Odesskoe Spetsial'noe Konstruktorskotekhnologicheskoe Byuro Prodoval'stvennogo Mashinostroeniya)

USSR Patent 710 547 (1980) [Ru]

The distributor comprises channels for distribution of the product and automatic valves for delivering the sterilized product, each of which consists of a shut-off mechanism. W&Co

79

High-speed aseptic packaging system.

Anon.

Food Engineering International 4 (11) 35-36 (1979) [En]

A description is given of the Erca Neutral Aseptic System. A multilayer plastics film is unreel, and immediately prior to entering a sterilization tunnel, the film is delaminated to provide a polypropylene/polystyrene body-forming layer, and a polyethylene lidding layer. Both are sterilized in a tunnel for 10 min at 216°C. Container bodies are formed from the body-forming layer, pass to the aseptic filling station, and then enter the sealing station. The lidding layer and an Al foil top from a separate reel are then applied together. Output capacity is 20 000-40 000 125-cm³ containers/h. Examples of milk and margarine containers are illustrated. DIH

80

Aseptic filling. I; Aseptic packaging. II.

Mann, E. J.

Dairy Industries International 45 (5) 37, 39, 67; (6) 23, 49 (1980) [En] [Commonwealth Bureau of Dairy Sci. & Tech., Shinfield, Reading RG2 9BB, UK]

This article surveys recent developments in aseptic packaging of milk and other dairy products, covering trends in the design of plant and applications in Europe, North America and Australia. FL

81

[Method and device for sterilization with a liquid sterilizing agent.]

Stahl, U. E. B. (Tetra Pak International AB)

Swedish Patent Application 401 912 (1978) [Sv]

A method for aseptic packaging of liquid foods, e.g. milk, involves the use of a liquid sterilizing agent finely

divided to form a mist which is mixed with a hot stream of air. The temp. of the air and the ratio between the amount of sterilizing agent and the amount of air is regulated so that the sterilizing agent evaporates and the dew point of the air moistened with sterilizing agent is higher than the temp. of the surface which is to be sterilized. The air mixture is then conveyed towards the surface which cools the air, so that the sterilizing agent is precipitated in an even layer on the surface where it acts for a period of time after which it is removed again. W&Co

82

[Device for sterilizing a web of packing material.]

Löthman, S. A. (Tetra Pak International AB)

Swedish Patent Application 401 913 (1978) [Sv]

A device for sterilizing a web of packaging material which is converted in a packaging machine into individual packages filled with sterile products, e.g. milk, comprises a unit for applying a liquid sterilizing agent to at least one side of the web and a unit for removing the sterilizing agent from it when the sterilizing effect has been achieved. The unit for supplying sterilizing agent comprises a first treatment station with a container for sterilizing agent through which the web of packaging material passes and another treatment station comprising a chamber which is provided with inlets and outlets for the web, and in which a nozzle member for sterilizing liquid is disposed and directed towards a surface which can be heated up to a temp. exceeding the evaporation temp. of the sterilizing agent used. W&Co

83

Effects of carton material and storage temperature on the flavour of UHT-sterilized milk.

Mehta, R. S.; Bassette, R.

Journal of Food Protection 43 (5) 392-394 (1980)

[8 ref. En] [Dep. of Anim. Sci. & Ind., Call Hall, Kansas State Univ., Manhattan, Kansas 66506, USA]

UHT sterilized milk packaged in Al foil-lined or plain polyethylene-lined cartons was stored for 1.5 months at 4°C in the dark or at 22°C under fluorescent light. 5 trained judges found milk at 4°C was not as stale and thus had a more acceptable flavour than milk at 22°C. Flavour of milk in Al foil-lined cartons was not as good as freshly pasteurized milk, but superior to milk in polyethylene-lined cartons. Increases in off-flavour intensity paralleled increases in concn. of n-pentanal and an unidentified neutral volatile compound. A 24-member, untrained consumer taste-panel preferred the flavour of freshly pasteurized milk to 3-month-old commercial or 6-month-old experimental UHT sterilized milk in Al foil-lined cartons, which in turn were preferred over 6-month-old experimental UHT sterilized milk in polyethylene-lined cartons. AS

84

[Folate contents in milk.]

Yamada, M.

Vitamins [Bitamin] 53 (5/6) 221-227 (1979) [Ja, en]

[Lab. of Nutr., Niigata Women's Coll., Niigata 950, Japan]

Folate contents in samples obtained from cows' milk and human milk were determined by a microbiological assay method with *Lactobacillus casei* ATCC 7469 as a test organism. For preparation of sample solution from each material, an improved technique by pretreatment with protease was employed throughout this study. Free and total folate contents in market milk and human milk estimated by the improved method amounted to 120-190% of those obtained by the ordinary method. After heating at 100°C for 5 min, however, free folate activities in cows' milk decreased to some degree. Total folate content was in raw milk $115.1 \pm 28.1 \mu\text{g/l}$, in UHT (130°C for 2 s) milk $118 \pm 53.2 \mu\text{g/l}$, and $115 \pm 45.3 \mu\text{g/l}$ in market milk. These results strongly suggest that cows' milk, whether fresh or processed, has almost the same folate level and a very wide range in the concn. of the vitamin. AS

85

The effect of UHT steam injection on the saturated aldehydes of half and half. [Lecture]

Hutchens, R. K.; Hansen, A. P.

Journal of Dairy Science 63 (suppl. 1) 41 (1980) [En]

[N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Raw cream was standardized to 10.5% fat, processed by UHT steam injection using 4 different time/temp. regimes, aseptically packaged and stored for 12 months at 24°C. Extraction and analysis revealed that concn. of butanal, hexanal, heptanal, octanal, nonanal, decanal, and several longer chain alkanals decreased during storage, while propanal and an unidentified alkanal increased. [See FSTA (1980) 12 12P1953.] DMK

86

Energy audit of ultra-high-temperature sterile milk processing. [Lecture]

Biziak, R. B.; Jones, V. A.

Journal of Dairy Science 63 (suppl. 1) 38 (1980) [En]

[N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Steam and electricity usage was monitored in a direct UHT processing line including homogenization and aseptic packaging. Energy use was measured at preheat temp. of 71-91°C, sterilization temp. of 137-149°C, holding tube pressure of 0.413-0.488 MPa and homogenization pressure of 13.78-34.47 MPa. [See FSTA (1980) 12 12P1953.] JMD

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FAB 10

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FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of:-

Commonwealth Agricultural Bureaux, Farnham Royal, Slough; Gesellschaft für Information und Dokumentation, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen.

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Titles of the FABs now available are given on the back cover of this booklet. For up-to-date lists of FABs or suggestions for new topics please write to the address on the back cover. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each month's abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

Some of the larger FABs have been divided into sections to facilitate use. FAB 47 also has a subject and author index provided.

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

EDITOR

1

High-speed aseptic packaging.

Anon.

Food Engineering International 5 (4) 40 (1980) [En]

A description is given of a high speed unit with cleaning-in-place facility, suitable for use with almost any pumpable product, available in 4 or 6 lane configuration or any number of filling stations and able to fill a package with up to 3 different components at a rate of between 8 and 24 000 cups/h. LH

2

[Aseptic packaging of coffee cream using Servac 78 AS.] Aseptische Kaffeesahne-Abfüllung und -Verpackung Einsatz der Servac 78 AS.

Anon.

Gordian 80 (4) 64, 66, 69 (1980) [De]

The Servac machine is a development of the TFA 240 AS machine manufactured by Produktbereich Höfliger + Karl (Federal Republic of Germany) and based on a Robert Bosch GmbH prototype. The machine uses a plastics film 570-mm wide for forming cups up to 100 mm deep; H_2O_2 sterilizing baths are separate for cup and closure films, the chemical sterilization being supplemented by hydraulic high-pressure jet treatment, which makes heating of H_2O_2 unnecessary. The installation is photographically illustrated, and that used in the Menken Dairy Food B.V., Oud Gastel, Netherlands and its operation are described in detail. At this factory, the Servac has a capacity of 500 000 filled cups/shift using 48 filling positions in 23 cycles/min and feeding automatically 2 cup packaging lines. The whole installation consists of a 20 000-l sterile tank supplying the sterile cream to the Servac machine, a crating assembly for 120-cup crates with 12-cup retail packs, and a crate-closing device. 4 workers are required for an output of 65 000 cups/h. SKK

3

[Destruction of vitamin B_1 during UHT treatment of milk.] Vitamin B_1 -Abbau während der UHT-Erhitung von Vollmilch.

Bayourni, E.-S.; Reuter, H.

Milchwissenschaft 35 (5) 278-279 (1980) [15 ref. De, en] [Inst. für Verfahrenstech., Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The vitamin B_1 content of milk was measured after direct UHT treatment at 120, 125, 130, 135, 140, 145 or 150°C for 2, 4, 8, 12, 16, 20, 24, 28 or 32 s. Losses of vitamin B_1 were shown to follow a 1st order reaction with a z value of 29.4°C. Assessment of the destruction of vitamin B_1 is suggested as a suitable means for measuring the effectiveness of UHT plants. MEG

4

[Vitamin changes in UHT-treated milk during storage.] Vitaminveränderungen der H-Milch während der Lagerung.

Görner, F.; Uherova, R.

Nahrung 24 (4/5) 373-379 (1980) [De, en, ru] [Chem. Tech. Fac., Slovak Tech. Univ., Bratislava, Czechoslovakia]

The losses of thiamin, riboflavin, vitamin B_6 , nicotinic acid and pantothenic acid in direct UHT-treated milk (140°C, 4 s) during storage at 6°, 20-25° and 37°C for 10 wk were investigated. Increased storage temp. led to decreases in vitamin contents. During storage for 6 wk at room temp., losses were thiamin and riboflavin 10%, nicotinic acid 20%, pantothenic acid 30% and vitamin B_6 35%. Total losses of vitamins in UHT-treated milk from processing and 6 wk storage at room temp. were riboflavin 10-15%, nicotinic acid 20-25%, thiamin 20-25%, pantothenic acid 30-35% and vitamin B_6 40-45% resp. IN

5

Changes in proteins in UHT heated milk.

Farah, Z.

Milchwissenschaft 34 (8) 484-487 (1979) [12 ref. En, de] [Inst. de Nutr. UFPE, Recife, Brazil]

The Aschaffenburg & Drewry method was used to determine the N distribution in milk before and after heat treatment and at intervals during storage for 48 wk at 20°, 33° or 45°C. Non-casein N was 21.4-22.6% of total N in raw milk, decreasing with direct UHT treatment to 12.0% (150°C for 0.8 s), 11.0% (150°C for 2.4 s), 10.9% (142°C for 10 s) and 7.7% (129°C for 100 s) and to 7.9% with autoclaving for 17 min at 116°C. The proportions of the β -lactoglobulin, α -lactalbumin and immunoglobulins in the whey proteins that were not precipitated with casein at pH 4.6 did not differ markedly between the heat treatments. During storage of autoclaved milk the non-casein N increased, more rapidly at higher storage temp., to reach about 18% of total N after 48 wk at 45°C. Equivalent changes in UHT milk (150°C for 2.4 s) were more marked and erratic, with a tendency for larger increases of non-casein N at 33°C than at 20° or 45°C; the increase of non-casein N included increases in proteose-peptone N and α -lactalbumin N, but not β -lactoglobulin N. JMD

6

Relationship of absorbance to process treatments and flavor during storage of ultra-high-temperature dairy products.

Swartzel, K. R.; Hansen, A. P.; McClure, W. F.

Journal of Dairy Science 63 (7) 1039-1042 (1980) [17 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Fluid dairy products (fat range, 0.5-10.5%) were processed in an UHT steam injection system. Time-temp. relationships of processing included 138°, 143° and 149°C for 20.3 s; 143° and 149°C for 6.9 s; and 149°C for 3.4 s. Product from each treatment was stored at 4°, 24° and 40°C. Absorbance readings were at 470 and 720 nm on subsamples at 4-wk intervals for 60 wk. Effects of light scattering were minimized by computing $\Delta A (A_{470} - A_{720})$. An increase in ΔA corresponded to change in slope of the spectrum between 470 and 720 nm, a change associated with discoloration (browning). All samples demonstrated an initial decrease in ΔA with an eventual increase over the storage period. Samples stored at 4°C decreased the most in ΔA and those at 40°C decreased the least. The eventual increase of ΔA occurred earlier and at a greater rate as storage temp. increased. With more

severe heat treatments, the initial ΔA 's were higher. From taste panel data compiled on the same samples at the same time intervals, an empirical relationship was formulated between ΔA , % fat, taste panel evaluations, and storage time. A high correlation between taste panel ratings and ΔA readings was possible, suggesting an effective quality assurance test for stored UHT dairy products. AS

7

[Destruction of *Bacillus stearothermophilus* during UHT treatment.] Abtötung von Mikroorganismen während des UHT-Prozesses am Beispiel von *Bacillus stearothermophilus*.

Konietzko, M.; Reuter, H.

Milchwissenschaft 35 (5) 274-275 (1980) [18 ref. De, en] [Inst. für Verfahrenstechn., Bundesanstalt für Milchtorschung, Kiel, Federal Republic of Germany]

In milk treated in a small-scale direct-heating UHT plant, the thermal death time curve for *B. stearothermophilus* was linear over the temp. range 130-145°C. The Z value for *B. stearothermophilus* was 10.75°C. A reduction in spore counts from 1000/ml to 1/1000 l was obtained by heating at 133.4°C for 60 s; a decimal reduction in spore counts was obtained by heating at 133.4°C for 6.66 s. MEG

8

[Changes in biochemical, physical, technological and sensory properties of UHT milk during storage.]

Veränderungen biochemischer, physikalischer, technologischer und sensorischer Merkmale von UHT-Milch im Verlaufe der Lagerung.

Blanc, B.; Flückiger, E.; Rüegg, M.; Steiger, G.

Alimenta Sonderausgabe Milcherhitzungsverfahren, 27-47 (1980) [52 ref. De, fr, en] [Eidgenössische Forschungsanstalt für Milchwirtschaft, CH-3097 Liebefeld-Berne, Switzerland]

In 2 experiments in Aug. 1977 and Jan. 1978, milk was processed by direct UHT treatment (Kasag Uperisation plant) or indirect UHT treatment (Stork Mini-Sterideal). Both the direct and the indirect UHT milk were aseptically packaged in 0.25-l Tetra-Brik (with Al foil) and tested after up to 32 weeks' storage at 5 or 25°C. Increases in free fatty acids and non-casein N, and decreases in free SH groups, vitamin C and pH, were more rapid at 25 than at 5°C, and the fat phase was less stable. The decreases in free SH groups and vitamin C occurred most rapidly in the indirect UHT milk, which contained more O₂ than the direct UHT milk. The indirect UHT milk took longer to coagulate with rennet, but its rennetability improved during storage.

The direct UHT milk contained more protein sediment (mainly denatured whey proteins) and showed greater increases in viscosity and greater gelling (especially at 25°C) than the indirect UHT milk. After 8-16 weeks consumers found that UHT milk stored at 5°C tasted much better than the UHT milk stored at 25°C, which was no longer fit for consumption in most cases. Direct UHT milk, which in all organoleptic assessments was preferred to the indirect UHT milk, was generally indistinguishable in flavour from pasteurized milk when stored for up to 8 weeks at 5°C, but after longer storage its flavour deteriorated. ADL

9

[Effect of heat treatment on the most important constituents and the nutritive value of milk.] Einfluss der thermischen Behandlung auf die wichtigsten Milchinhaltsstoffe und auf den ernährungsphysiologischen Wert der Milch.

Blanc, B.

Alimenta Sonderausgabe Milcherhitzungsverfahren, 5-25 (1980) [41 ref. De, fr, en] [Eidgenössische Forschungsanstalt für Milchwirtschaft, CH-3097 Liebefeld-Berne, Switzerland]

Milk supplied each month from Jan. 1976 to Jan. 1977 was processed by pasteurization for 15 s at 72°C, pasteurization for 20 s at 92°C, direct UHT treatment for 2.3 s at 160°C or indirect UHT treatment at 141°C, with 14 s at >100°C [see also preceding abstr.]. Tables and graphs show month-by-month variations in non-casein N, α -lactalbumin, β -lactoglobulin, free NH₂, tryptophan, total amino acids, vitamins (A, B₁, B₂, B₆, C and PP), chemical score, Mitchell index, rat requirement index, xanthine oxidase and peroxidase activity, lysozyme content, coagulation behaviour and microbiological criteria (lag phase of *Escherichia coli* inoculated into the milk and incubated at 38°C; both for heat-treated and for raw milk. Blood leucocyte counts of test subjects decreased by 11.4, 9.6 and 19.4% resp. within 60 min after ingestion of raw milk, 92°C pasteurized milk and direct UHT milk, with decreases of 4.5, 3.7 and 10.2% in lymphocytes but increases of 6.1, 5.5 and 6.9% in stab neutrophils. In organoleptic evaluations after 1 day's storage, raw milk was ranked best, followed by 72°C pasteurized, direct UHT, 92°C pasteurized and indirect UHT, in that order. After 7 days' storage all milks were ranked the same, except indirect UHT, which was inferior. ADL

10

[Comparison of the long-term physiological effects of raw, pasteurized and UHT milks in rat diets.]

Ernährungsphysiologischer Vergleich von roher, pasteurisierter und ultrahocherhitzter Milch in einem Langzeitversuch mit Ratten.

Sieber, R.; Rüst, P.; Blanc, B.

Alimenta Sonderausgabe Milcherhitzungsverfahren, 49-56 (1980) [34 ref. De, fr, en] [Eidgenössische Forschungsanstalt für Milchwirtschaft, CH-3097 Liebefeld-Berne, Switzerland]

The long-term physiological effects of raw milk, pasteurized milk (15 s at 72°C) and indirect UHT milk were compared in 3 test groups of rats, over 20 generations. About 66% of the ration of each group was milk, in freeze-dried form, and the remainder of the ration consisted of rice starch, vitamins, minerals, sucrose, cellulose powder, etc. There were 2 control groups, one of which received a corresponding ration made up of casein + methionine, lactose and butter, while the other received a standard rat feed. Growth was significantly better on raw milk than on pasteurized or UHT milk, although this may have been due to a higher intake of raw milk and to uncontrolled variations in ration composition. The size and total weight of litters were higher in the raw milk group, but the weight of individual pups was greatest in the pasteurized milk group. There were some significant differences between

the groups in the weight of internal organs (stomach, liver, spleen, kidneys and adrenal glands), but not in the histopathology of the organs. Of various parameters measured in blood serum, only chloride, urea, alanine aminotransferase and triglycerides differed significantly between groups. ADL

11

[Microbiological control of UHT milk.] Mikrobiologische Kontrolle der H-Milch. [Review] Vögele, P. *Molkerei-Zeitung Welt der Milch* 34 (18) 582-583, 586-588, 590; (22) 754-761 (1980) [52 ref. De] [Tetra Pak Res. GmbH, Stuttgart, Federal Republic of Germany]

This extensive review, intended as a basis of discussion for the packaging industry, deals with the definition of UHT milk; the purposes of control; the problem of bacteriological control of UHT milk (including comparisons with pasteurized milk, the concept of commercial sterility, unavoidable technical and sterility control defects, sterility in the pharmaceutical and canning industries, theoretical performance of UHT treatment, error tolerance of UHT processes, and routine control); control of production of UHT milk; final product control; and search for errors (trouble shooting). SKK

12

[Milk and dairy products. Sensory testing. Long-life milk drinks.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Haltbare Milchmischgetränke. German Democratic Republic, Institut für Milchlorschung der DDR *German Democratic Republic Standard TGL 26208/29*, 3pp. (1978) [De] [Oranienburg, German Democratic Republic]

This standard specifies the typical appearance, odour and flavour for UHT chocolate-flavoured milk with 1 or 2.5% fat and for UHT vanilla-flavoured milk with 1% fat. The max. unweighted score for each characteristic is 5, with a weighing factor of 2 for flavour but only 1 for appearance and odour. The number of points to be deducted from the max. score depending on the degree of deviation from the typical appearance, odour or flavour is indicated. When points are deducted, the nature of the deviation must be stated. The temp. of the samples must be $16 \pm 2^\circ\text{C}$. The test procedure is laid down in TGL 26208/01 [FSTA (1980) 12 4U374]. ADL

13

[Milk and dairy products. Sensory testing. Long-life milk.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Haltbare Milch. German Democratic Republic, Institut für Milchlorschung der DDR *German Democratic Republic Standard TGL 26208/30*, 2pp. (1978) [De] [Oranienburg, German Democratic Republic]

This standard describes the typical appearance, odour and flavour required of UHT milk with 2.5 or 3.2% fat. The max. unweighted score for each characteristic is 5, with a weighing factor of 2 for flavour but only 1 for appearance and odour. The number of points to be

deducted from the max. score depending on the degree of deviation from the typical appearance, odour or flavour is indicated. When points are deducted, the nature of the deviation must be stated. The temp. of the samples must be $16 \pm 2^\circ\text{C}$. The test procedure is laid down in TGL 26208/01 [FSTA (1980) 12 4U374]. ADL

14

Process for the aseptic packing of products and machine employing said process.

Pioch, M. M. R. (Pont-A-Mousson SA) *United States Patent* 4 208 852 (1980) [En]

An aseptic packing machine is described comprising an enclosure through which a stream of sterile air flows and means for producing the stream of air. A station for producing containers, a filling station, a closing station and a transfer device cooperating with the stations are inside the enclosure. The moving mechanical parts of the stations and transfer device which could be contaminated are outside the sterile enclosure. AS

15

[Behaviour of Type C milk treated by a UHT process, packaged in non-sterile packaging and stored at 4°C .] Valle, J. L. E. do; Takahashi, S.; Keating, P. F.; Martins, J. F. P.; Figueiredo, I. B.

Boletim do Instituto de Tecnologia de Alimentos, Brazil 16 (1) 81-89 (1979) [5 ref. Pt, en] [Inst. de Tecnologia de Alimentos (ITAL), Campinas, Sao Paulo, Brazil]

On the Brazilian market there are 2 types of pasteurized milk, Type B and Type C, which must not exceed 40 000 and 150 000 microorganisms/ml resp. after pasteurization. UHT milk is also marketed, under the name of long-life milk, and by law must have a storage life of 2-3 months at ambient temp. In this study, raw milk of Type C was treated by a UHT process, with the following phases: pre-heating to 65°C and homogenization at 100 kg/cm^2 ; sterilization for 4 s at 130°C , with a Stork Sterideal installation of the indirect type; cooling to 65°C with further homogenization; final cooling to 4°C with chilled water, and non-aseptic packaging with plastics film in a Prepac machine. The raw milk used (3.5-4.0% fat, pH 6.60-6.65) had total bacterial counts ranging from 4.4×10^6 to $2 \times 10^7/\text{ml}$, with wide variations in psychophilic, coliform and thermophilic counts. Titratable acidity ($^\circ\text{D}$), pH, total counts and psychophilic counts measured weekly in 10 samples of the UHT milk stored for ≤ 6 weeks at 4°C are tabulated. The aggregate homogenization pressure of 150 kg/cm^2 was found to be sufficient, as separation of fat was negligible ($< 1\text{ g/l}$). There were no changes in titratable acidity and pH, and no thermophilic bacteria were detected. Total counts reached 200 000/ml after 4-6 weeks. From these results it is concluded that UHT milk of Type C has a storage life of 20-25 days. ADL

16

[UHT plants with indirect heating. The GEA Alborn-IHS series.] UHT-Anlagen mit indirekter Wärmeübertragung. Die GEA AHLBORN-IHS-Anlagenserie. Buchwald, B.

Deutsche Milchwirtschaft 31 (15) 579-582 (1980) [De]

Technical data are given of the GEA Ahlborn-IHS series of UHT sterilizers manufactured in 2000-33 000 l/h capacities. Operating times are normally 8-12 h; cleaning process and costs are illustrated with an example of an 11 000 l/h plant. Heat regeneration rates of 92% are claimed for operation under usual conditions but max. of 97% could be feasible under certain conditions provided that milk pre-heating is carried out in a pasteurizer with 90% heat regeneration. FL

17

New aseptic filling line for Dairy Crest.

Anon.

Dairy Industries International 45 (9) 27, 31 (1980) [En]

A new packaging line at Dairy Crest, Lancashire Group Dairy, UK, includes a Combibloc CF 5000 twin track aseptic filler linked to automatic tray-forming and packaging arrangement and shrink-wrapping equipment. It is used for aseptically filling UHT milk in 1-pint cartons at rates of up to 5000/h for distribution in the North of England, Midlands and East Anglia. The cartons are packed in batches of 12 in corrugated trays, shrink-wrapped and manually stacked onto pallets, with each pallet carrying 120 trays. CDP

18

[The market for liquid milk and fresh milk products.]

Der Markt für Konsummilch und Milchfrischprodukte. Kynast, U.

Deutsche Milchwirtschaft 31 (29) 1203-1204, 1207-1208 (1980) [De]

Changes in production and consumption of different types of milk products in the Federal Republic of Germany in recent years are tabulated and discussed. Products covered include: market milk with ≥ 3.5 , 1.5-1.8 and $\leq 0.3\%$ fat; UHT milk; buttermilk; different types of yoghurt, kefir, cultured cream and other cultured products; whipping cream and sterilized and UHT cream; fresh cheeses and quarg; and dairy desserts and puddings. Details are also given of the retailing structure for fresh milk and UHT milk: 41% of fresh milk is sold by traditional shops and 23% by direct sales, whereas 64% of UHT milk is sold by discount stores etc. ADL

19

[UHT milk market in the Federal Republic of Germany: marketing and costs analysis.] Der Markt für H-Milch unter Marketing- und Kostenaspekten in der Bundesrepublik Deutschland.

Drews, M.; Longuet, D.

Kieler Milchwirtschaftliche Forschungsberichte 32 (2) 89-121 (1980) [13 ref. De, en, fr] [Inst. für Betriebswirtschaft & Marktforschung der Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

20

[Aseptic valve.] Aseptisches Ventil.

Leonard Schleicher Südmo-Armaturenfabrik GmbH
German Federal Republic Patent Application

2 842 813 (1980) [De]

A valve is described for use in the preparation of sterile beverages and liquid foods which prevents contamination with atmospheric air. W&Co

21

[Aseptic packaging of foods: the Neutral Aseptic System.] Aseptisches Verpacken von Lebensmitteln: Das Neutral Aseptic System.

Anon.

Verpackungs-Rundschau 31 (2) 135-138, 140 (1980) [De]

The ERCA Neutral Aseptic System for aseptic packaging of foods is described; the system is based on thermal sterilization of the equipment and packaging material with hot air or steam. Laboratory studies showed that sterilization at 200°C for 25 s completely eliminated *Bacillus subtilis* var. *niger*. The packaging line uses multilayer laminate film for the main body of the pack; 2 different laminates are available (polystyrene/polypropylene/polyethylene for normal applications, polystyrene/PVDC/polypropylene/polyethylene if long shelf-life is required). The polyethylene layer is delaminated from the polypropylene layer in a preheating tunnel; the main body of the film is formed into the pack, which is then filled, the polyethylene cover layer is re-sealed on, and an outer lid of printed Al foil/heat sealable plastics laminate is applied. Multiple heating units ensure sterile conditions throughout the packaging process. IN

22

Aseptic packaging. What's in store?

Anon.

American Dairy Review 41 (10) 24-27 (1979) [En]

The future importance of aseptic packaging in the USA is discussed with reference to milk and juice marketing techniques, the looming energy crisis, Canadian and European progress, and the saving of expensive refrigerated space. Problems to be overcome relate to introduction of FDA aseptic packaging regulations, lack of research in packaging, lack of comparative costs information, consumer resistance, economic justification, and the need possibly for a new marketing image for unrefrigerated milk. JMa

23

Quality of UHT milk, stored at refrigerated and ambient temperatures as compared to HTST pasteurized milk.

Mogensen, G.; Poulsen, P. R.

Milchwissenschaft 33 (9) 552-554, 556 (1980) [15 ref. En, de] [Gov. Res. Inst. for Dairy Ind., Hillerød, Denmark]

Milk, standardized to contain 1.5% fat, was UHT-treated in a Palarisator direct-heating (140°C for 4 s) plant, cooled to 8°C and filled into 0.5 l cartons made of paperboard coated with polyethylene (PE), paperboard coated with PE and lined with Al or paperboard coated

with a special plastics (SP), or into glass bottles wrapped in Al foil. Cartons and bottles were stored at 8°, 20°, 35° or 55°C in darkness for up to 1 yr. No significant colour changes were observed in any of the milks stored at 8° or 20°C for 6 months. At 35°C, only milk stored in PE cartons (without Al) had a satisfactory colour after 2 months, and at 55°C the colour of milk stored in all 4 types of packages deteriorated rapidly. Above 20°C, the speed of colour changes decreased in the order; glass bottles > PE-Al cartons > SP cartons > PE cartons. There was no relationship between colour change and shelf life. Samples stored at 8°C in PE cartons showed a pronounced off-flavour after 14 days. At higher temp., this off-flavour developed rapidly in PE cartons. In the other 3 types of containers, the milk was without flavour defects when stored at 8°C for up to 1 month, and was acceptable for approx. 6 months. These results indicate that to obtain a reasonable keeping quality of UHT milk, the containers should be impermeable to oxygen and the packaged milk should be stored below 20°C. In all tests, HTST pasteurized milk was used as reference, but no details are given. MEG

24

[Production of UHT milk.]

Janca, J.

Prumysl Potravin 31 (2) 91-92 (1980) [Cs] [Milex, np, Bratislava, Czechoslovakia]

UHT milk has been produced in the Milex dairy plant, Bratislava, Czechoslovakia since Dec. 1975, employing direct steam injection with heating to 140°C and evaporative cooling to 75°C to restore the water content of the milk to the initial level. After homogenization the milk is packaged aseptically on a Tetra Brik machine. Information is given briefly on requirements for milk for UHT processing and on process control and automation. FL

25

[Use of saprophytic bacteria metabolites in UHT milk for assessment of hygiene quality of the raw milk.]

Saprophytär-bakterielle Stoffwechselprodukte in der UHT-Milch zur Beurteilung der bakteriologisch-hygienischen Wertigkeit des verwendeten Ausgangssubstrates.

Muschick, R. C.; Heeschen, W.; Tolle, A.; Suhren, G.

Kieler Milchwirtschaftliche Forschungsberichte 31 (4) 363-386 (1979) [33 ref. De, en, fr] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

Contents of pyruvate, lactate, free fatty acids, and ammonia in UHT milks were studied as possible indicators of the hygienic quality of the raw milk. Tests on effects of UHT treatment on these metabolites were carried out in a Stork tubular UHT sterilizer at 120, 130, 140 or 145°C for approx. 3 s; all other tests were carried out at 144°C for 5 s in a laboratory UHT outfit constructed by the authors and diagrammatically illustrated. It is concluded that pyruvate is unsuitable as quality indicator because it increases during UHT treatment, decreases in subsequent storage and is oxidized by H₂O₂, frequently present in UHT milks; that lactate and free fatty acids might serve as indicators of

glycolytic and lipolytic processes in raw milk, because their contents are little affected by UHT treatment and subsequent storage; and that ammonia content is of no diagnostic value, being markedly affected by UHT treatment and storage. SKK

26

Durability of enterotoxin B in liquid whole milk against ultra-high temperature pasteurization.

Haruta, M.; Murakami, H.

Bulletin of the College of Agriculture and Veterinary Medicine, Nihon University [Nihon Daigaku Nojoigakubu Gakujutsu Kenkyu Hokoku] 37 (55) 31-35 (1980) [11 ref. En, ja] [Dep. of Food Tech., Coll. of Agric. & Vet. Med., Nihon Univ., Tokyo, Japan]

Crude enterotoxin B from the filtrate of a 24-h culture of *Staphylococcus aureus* ATCC 14458 was added at 54.04 µg/ml to 40 l raw milk, and subjected to UHT treatment. Recoveries of toxin from the holding tank after pre-heating for 3 and 6 min, resp. at 90°C were 18.5 and 19.7%, whilst in the finished product, sampled at 5-min intervals at the outlet, recoveries ranged from 35.5 to 37.1% (4 samples). This suggested that some reactivation occurred following heating at 121°C for 2 s; reactivation was confirmed by heating purified enterotoxin B at 90°C then 121°C, and was even more evident when purified enterotoxin A was heated at 60°C then 80°C. CDP

27

UHT in Bermuda? Dunkley's dairy does it. Futch, M.

Dairy Field 163 (6) 45, 48 (1980) [En]

Dunkley's Dairy, Devonshire, Bermuda, installed 2 Cherry Burrell Unitherm 21 aseptic processing systems last autumn to process and package initially portion- and quart-sized coffee creamers to which will be added later this year quarts of filled milk and a chocolate milk drink, and eventually all the dairy's products including fresh milk. Extended shelf-life is the major advantage of this processing system which also helps in the distribution which is carried out in 4 delivery trucks (insulated but not refrigerated) at mean ambient temp. of about 70°F. The shelf-life is about 21 days, another advantage being that shopkeepers can place larger orders and be assured that the product will remain fresh. FL

28

[Retention of some vitamins during direct UHT-treatment of milk.] Retention von einigen Vitaminen während der Ultrahocherhitzung von Milch.

Görner, F.; Uherova, R.

Nahrung 24 (8) 713-718 (1980) [27 ref. De, en, ru] [Chem.-Tech. Fak., Slovakian Tech. High School, Bratislava, Czechoslovakia]

Over a period of 2 yr and on 4 occasions milk was pasteurized at 85°C, sterilized in a UHT-VTIS installation at 140°C for 2-3 s, homogenized, cooled and aseptically packaged in polyethylene/Al foil laminate packages (Tetra Brik). Samples of milk were taken before UHT treatment and after packaging. The following losses of vitamins were recorded: vitamin A 2.8%, β-carotene 6.1%, thiamin 18%, riboflavin 2.4%, vitamin B₆ 7.3%, nicotinic acid 4.0% and pantothenic acid 3.6%. IN

29

Heat transfer to canned liquids. (In 'Food process engineering 1979'[see FSTA (1981) 13 4E167]) [Lecture]

Duquenois, A.

Abstr. no. 1.2.11 (1979) [En][ENSIA, 1 avenue des Olympiades, F-91305 Massy, France]

During thermal sterilization of cans, heat transfer from the heating medium to the centre of the can contents is hindered by thermal resistance (i) between the heating medium and the can wall, (ii) of the can wall material, (iii) the internal boundary layer between the wall and heated product, and (iv) of the product itself. (i) is very low for steam and (ii) is negligible for metal cans. (iii) and (iv) depend on the nature of the product and its agitation. Experimental studies were made of heat transfer to cans, rotating end-over-end, containing various liquids (water, sugar solution, oil), in relation to physical properties of the product, size of the can, temp. of the heating medium and speed of rotation. Formulae were developed applicable to any liquid contained in a rotating cylindrical can. ELC

30

[Relationship between taste and sulphur compounds in long-life milk.]

Görner, F.; Sedlak, J.; Heldak, J.

Pol'nohospodarstvo 24 (10) 916-923 (1980) [18 ref. Sk, en, ru][Chemickotech. Fak., Slovenska Vysoka Skola Tech., 800 37 Bratislava, Czechoslovakia]

Samples of UHT milk produced as described in FSTA (1977) 9 9P1408 and in their original packaging were stored for ≤ 31 days at 2-3° or 20-23°C and examined at frequent intervals for contents of total free sulphhydryls, non-protein free sulphhydryls and disulphides by the method of Sedlak & Lindsay [Analytical Biochemistry (1968) 25, 192], and changes in the initial cooked-milk taste were noted. Results are tabulated. In the 1st 10 days of storage at either temp., changes in cooked taste intensity coincided with increases or decreases in S compound contents; thereafter, there was no parallelism between the 2. It was concluded from taste change findings that 6 wk should be the max. storage life for the UHT milk examined. SKK

31

[Evaluation of thermal efficiency of UHT installations for milk.] Zur Bewertung der thermischen Wirksamkeit von UHT-Anlagen für Milch.

Reuter, H.

Milchwissenschaft 35 (9) 536-540 (1980) [29 ref. De, en][Bundesanstalt für Milchwissenschaft, Kiel, Federal Republic of Germany]

In this review-type article, the kinetics of thermal efficiency calculations for UHT installations are outlined and estimates of sterilization effects are tabulated for 4 direct and 8 indirect UHT plants based on data on F values for elimination of microorganisms

or spores, E values for enzyme inactivation, C values for chemical degradation reactions, and SH values for formation of 5-hydroxymethylfurfural, a precursor in the Maillard reaction, contained in 12 quoted test reports from the author's Institute. SKK

32

[Relationship between taste and sulphur compounds in long-life milk.] (In 'Zbornik prednasok zo IV. celostatneho Sympozia o aromatických látkach v pozivatinach'[see FSTA (1981) 13 5T214]) [Lecture]

Görner, F.; Sedlak, J.; Heldak, J.

pp. 20-23 (1979) [5 ref. Sk][Katedra Tech. Mikrobiol. & Biochem., Slovenska Vysoka Skola Tech., 880 37 Bratislava, Czechoslovakia]

Samples of UHT milk produced as described in FSTA (1977) 9 9P1408 were stored at 2-3 or 20-23°C for 31 days, and changes in contents of total sulphhydryl compounds (T-SH) were determined at intervals by the method of Sedlak & Lindsay [Analytical Biochemistry (1968) 25, 192]; taste changes were assessed at the same time. It was concluded from graphically presented results that at both temp. T-SH rose initially for 2-3 days, then declined to min. values at 10 days and fluctuated at slightly higher levels thereafter. Intensity of the cooked taste varied in parallel, but the correspondence is not considered causal. SKK

33

[Sterilization and aseptic packaging of UHT milk.] Thiebaut, C.

Revue Laitiere Francaise No. 389, 9, 11, 13-15; No. 390, 9, 11, 13-14 (1980) [Fr]

An account of plants for UHT sterilization of milk available in France is given in part I, covering the following suppliers: Alfa-Laval (VTIS and Steritherm), APV (Uperiser and Ultramatic II), Stork (Sterideal and Steritwin), Laguillharre, Sordi (Steriplak), Rossi & Catelli (Stematic Long Run), Cherry Burrell (Spiratherm No-Bac and Aro Vac), Actini and Ahlborn. The 2nd part deals with aseptic packaging machines including the Tetra Pak range, Combibloc-PKL, ERCA NAS, Rommelag - Bottle Pack, Thimonnier DRV 13 ST and Prepac aseptic. FL

34

[Contribution to assessment of keeping quality of UHT milk.] Beiträge zur Beurteilung der Haltbarkeit von UHT-Milch.

Switzerland, Eidgenössische Forschungsanstalt für Milchwirtschaft

Schweizerische Milchzeitung 106 (68) 451-452 (1980) [3 ref. De]

See FSTA (1981) 13 1P208-1P210.

35

[Fruit juice in single portion cartons. The Tetrabrik system for 0.2 l packages.] Fruchtsaft im "Portions-Karton". Abfüll- und Verpackungstechnik des Tetrabrik-Systems für 0.2 Liter-Portionspackungen. Armgart, S.

Flüssiges Obst 47 (9) 367-369, 372 (1980) [De]

Production of single-portion fruit juices and beverages by the Tetrabrik Aseptic System is briefly described, including filling and packaging technology, the Tetra Pak drinking straw applicator, shrink-strip multipacker, Tetra Pak traypacker and palletizer. RM

36

[Report on type testing of the type VTIS ultra-high temperature installation for throughputs of 2000-8000 l/h.] Bericht über die Typprüfung der

Ultrahocherhitzungsanlage Typ VTIS
Volumenstrombereich 2000 bis 8000 l/h.

Reuter, H.; Biewendt, H.-G.; Wasserfall, F.; Teuber, M. *Kieler Milchwirtschaftliche Forschungsberichte* 32 (3) 199-234 (1980) [11 ref. De, en, fr] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

The VTIS UHT installation of 4000 l/h capacity submitted for tests by the manufacturers, Alfa-Laval Industrietechnik GmbH, Glinde, Federal Republic of Germany to represent the whole VTIS range of 2000, 4000, 6000 and 8000 l/h capacities was tested. The procedures of technical, bacteriological, and nutritional tests, and their respective results are reported in detail. On the basis of the positive findings regarding all these aspects, no objections are raised to official approval of the VTIS range; and it is considered that, after official approval, VTIS installations could be combined with all approved aseptic packaging machines and sterile tanks. SKK

37

[Changes in contents of water-soluble vitamins in long-life milk.]

Uherova, R.; Görner, F.

Prumysl Potravin 31 (2) 101-104 (1980) [16 ref. Sk] [Chemickotech. Fak., Slovenska Vysoka Skola Tech., Bratislava, Czechoslovakia]

Bulk milk from the Bratislava environments was flash-pasteurized at 85°C and then treated in the UHT processing line described in FSTA (1977) 9 9P1408. Packaged UHT milk produced in May and Sept. 1976 and in March and July 1977 was stored at 6, 20-25 or 37°C for ≤ 10 wk, and contents of (i) thiamin, (ii) riboflavin, (iii) nicotinic acid, (iv) pantothenic acid and (v) vitamin B₆ were determined initially and after storage for 1, 2, 4, 6, 8, and 10 wk. The results are graphically presented in detail. Progressive storage losses increased with increase in storage temp. The losses (%) after UHT heating to 140°C for 4 s and after storage for 6 wk at 20-25°C were resp.: (i) 18 and 25-30 (ii) 2.4 and 10-15, (iii) 4 and 25-30, (iv) 3.6 and 30-35, and (v) 7.3 and 40-45. It is suggested that because of vitamin losses, the storage life of UHT milk should be reduced to 6 wk from the 8-wk guaranteed time. SKK

38

[Quality criteria of UHT milk from the consumer's viewpoint.] Qualitätskriterien der H-Milch aus der Sicht des Verbrauchers.

Kess, U.

Deutsche Milchwirtschaft 31 (32) 1292-1297 (1980) [2 ref. De] [Milchwirtschaftliche Abteilung, Justus-Liebig-Univ., Giessen, Federal Republic of Germany]

Of > 2000 housewives interviewed in the Federal Republic of Germany, 96% regarded milk as healthy, 94% as nutritious, 89% as rich in vitamins, 83% as rich in protein, 34% as low in fat, 33% as low in calories, 84% as fresh, 49% as good in keeping quality, 43% as suitable for long storage, 51% as good value for money, 42% as too expensive, 85% as tasty, 90% as good for drinking, 75% as thirst-quenching, and 94% as good for cooking and baking. Most housewives considered all these characteristics important or very important. They appeared to attach greatest importance to milk being healthy, fresh, rich in vitamins and tasty (these 4 characteristics being regarded as very important by 59, 59, 46 and 45% of housewives, resp.). On the basis of the various characteristics, profiles are plotted for UHT milk and fresh milk as assessed by housewives using only UHT milk (29% of all milk users), housewives using only fresh milk (28%), housewives using both kinds of milk (25%), etc. The survey revealed that some consumers knew surprisingly little about UHT milk (26% of milk users had never tried it). It also showed that many consumers (especially those who liked drinking milk) demanded above all a good natural flavour. ADL

39

Effects of adding potassium iodate to milk before UHT treatment. I. Reduction in the amount of deposit on the heated surfaces.

Skudder, P. J.; Thomas, E. L.; Pavey, J. A.; Perkin, A. G. *Journal of Dairy Research* 48 (1) 99-113 (1981) [43 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Additions of potassium iodate to milk at 0.05 and 0.1 mM (10 and 20 p.p.m.) before UHT treatment markedly reduced the rate at which pressure built up during processing. This permitted use of longer processing times before unacceptable pressures were reached in the heat exchangers. Iodate reduced the amount of protein deposited, particularly in the higher temp. sections of the plant, but had no effect on deposition of minerals. The more compact nature of the highly mineral deposits offered less resistance to the flow path. Reduction in the amount of protein deposited is likely to be caused by increased denaturation of β -lactoglobulin and oxidation of heat activated sulphhydryl groups by the iodate, thus reducing the formation of high mol. wt. polymers of sulphur-containing proteins at the heated surfaces. Increasing the level of sulphhydryl groups in the milk through the addition of L-cysteine-HCl caused an increase in the amount of deposit formed during UHT treatment. Whilst little detrimental effect on the quality of the milk resulted from additions of iodate at 0.05 mM, milks with 0.1 mM-iodate became bitter during subsequent aseptic storage. Bitterness was a result of iodate-induced proteolysis of casein. AS

40

Effects of adding potassium iodate to milk before UHT treatment. II. Iodate-induced proteolysis during subsequent aseptic storage.

Skudder, P. J.

Journal of Dairy Research 48 (1) 115-122 (1981)

[27 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Addition of potassium iodate to milk at 0.1 mM before UHT treatment resulted in rapid breakdown of α_s - and β -casein during subsequent aseptic storage. Max. rates of proteolysis were observed at storage temp. of 37-45°C, but the reaction was strongly inhibited by storage at 55°C and by increased holding time at 140°C during UHT sterilization. Iodate-induced proteolysis of purified α_s - and β -casein was detected only with solutions in the serum phase of raw milk; no proteolysis occurred with solutions in 0.1 M-phosphate buffer (pH 6.7) or in milk ultrafiltrate, irrespective of whether whey proteins and lactose were also added. Thus, it appears that iodate increased the activity of ≥ 1 proteolytic component present in milk and were unable to pass through an ultrafiltration membrane. However, it is unlikely that iodate acts by increasing the activity of proteinases produced by contaminant bacteria; presence of iodate did not affect the activity of a proteolytic enzyme isolated from *Pseudomonas fluorescens* PM-1. Furthermore, iodate promoted protein breakdown during storage of milk drawn aseptically from the cow and subsequently UHT processed. It is suggested that iodate increased the activity of native milk proteinases, other than plasmin which was inactivated by UHT treatment, possibly by preventing thiol-disulphide exchange reactions during the heating process. [See preceding abstr. for part I.] AS

41

[Construction and operation of UHT installations.]

Bau- und Wirkungsweise von UHT-Anlagen.

Damerow, G.

Deutsche Milchwirtschaft 31 (37) 1456-1463 (1980) [3 ref. De] [Alfa-Laval-Industrietechnik GmbH, Glinde bei Hamburg, Federal Republic of Germany]

In this paper, illustrated with a number of photographs and diagrams, the Alfa-Laval VTIS-type direct heating UHT installations of 1000-20 000 l/h capacity, the Steritherm-type indirect heating installations of 500-25 000 l/h capacity, the laboratory installations for steam injection and direct and/or indirect additional heating of 115-150 l/h capacity, and sterile tanks of 300-25 000 l capacity are described; as well as their time/temp. relationships, cleaning procedures etc. Multi-purpose UHT installations for production of puddings and desserts, foamed dessert products, mixed milk beverages, and whipped cream are also described; and choice between indirect and direct UHT installations is discussed from the viewpoint of customer's requirements. SKK

42

[Milk deposit formation from mastitis and second grade milk.]

Nakazawa, Y.; Sakauchi, I.; Miyazawa, T.

Japanese Journal of Dairy and Food Science [Rakuno Kagaku Shokuhin no Kenkyu] 29 (2) A69-A75 (1980)

[14 ref. Ja, en] [Kyoritsu Women's Univ., Hitotsubashi, Chiyoda-ku, Tokyo, Japan]

The effect of milk quality on deposit formation during UHT sterilization was investigated using 3750 kg samples of normal milk, and of 2nd grade milk (positive to the alcohol test) and mastitic milk, diluted with normal milk 1:2, and a 7500 kg sample of 1st grade milk. Total processing time was 5 min for 1st grade milk and 3 min for the other samples and the UHT stage was at 130°C for 2 s. During holding at 80°C the amount of deposit was greatest in mastitic milk but white flecks were not observed. During processing, 2nd grade milk formed large deposits, which turned brown and were not removed by the usual cleaning agent. Mastitic milk formed smaller deposits similar to normal milk; the deposits were removed by cleaning agents. Processed 1st grade milk was regarded by all members of a taste panel as being superior to the other milks whereas 2nd grade milk was rejected as unclean, stale or sour; mastitic milk was considered to have a flat taste but received the same total score as normal milk. 2nd grade and mastitic milk had a lower content of TS than normal and 1st grade milk, 10.3 vs. 11.2%. BWH

43

The growth of UHT.

Unwin, K.

Food Manufacture 55 (7) 53, 55 (1980) [En]

The recent developments in ultra-high temp. processing plant, particularly in respect of milk processing, are briefly discussed. The volume of UHT-processed milk production and sales in the UK are expected to rise considerably over the next few years, and this is accompanied by diversification of the process into techniques for the production of aseptically packaged fruit juices, flavoured milks and puddings, and cream. JRR

44

Flexible package.

Drisan Packaging Ltd.

British Patent 1 571 665 (1980) [En]

Food is sterile packaged in flexible envelope filled with inert gas and irradiated with UV light. IFT

45

[Chemical studies on the hygienic quality of long life milk packs. I. Migration during long term storage.]

Sato, K.; Watanabe, Y.; Yoshida, R.; Endo, F.

Annual Report of Tokyo Metropolitan Research Laboratory of Public Health 29 (1) 230-233 (1978)

[6 ref. Ja] [Tokyo Metropolitan Res. Lab. of Public Health, 24-1 Hyakunincho 3 chome, Shinjuku-ku, Tokyo, 160 Japan]

Migration from the walls of 1-l multilayer polyethylene Tetrapak cartons for UHT milk was studied using water, 4% acetic acid, 20% ethanol and n-heptane as solvents, kept at room temp. for 2–24 wk. No Al was detected in distillation residues and no change in KMnO_4 consumption with increasing storage time was noted. There was no consistent increase in distillation residues from water, acetic acid or ethanol with storage time and residues were always ≤ 5 mg/kg. With n-heptane, residues increased with time from 18.67 mg/kg after 2 wk to 36.67 mg/kg after 24 wk, and on the basis of this it was estimated that in the same time scale the residues in milk (4% fat) would increase from 0.75 to 1.47 mg/kg, and in cream (20% fat) from 3.73 to 7.33 mg/kg. Residues in n-heptane were identified by spectrophotometry as mainly n-paraffins, and by GLC and gel permeation chromatography as having mol. wt. about 500–1200. BWH

46

[Evaluation of thermal efficiency of UHT installations. I. Bases of reaction kinetics.] Bewertung der thermischen Wirksamkeit von UHT-Anlagen. I. Reaktionskinetische Grundlagen. Reuter, H.

Deutsche Molkerei-Zeitung 101 (12) 362–370 (1980) [14 ref. De] [Bundesanstalt für Milchwissenschaft, Kiel, Federal Republic of Germany]

The formal kinetic bases of destruction of microorganisms, spores and enzymes, of changes in taste, colour and consistency of the product, and in breakdown of its nutrients during heat treatment are presented. The time law, reaction velocity constants, Q_{10} , D and Z values are defined with relevant formulae; and calculations of absolute breakdown rates and of reaction kinetics of formation of new compounds are given. SKK

47

Half a million creams a day. Anon.

Food Manufacture 55 (7) 57 (1980) [En]

A fully automatic packaging plant recently commissioned at Menken Dairy Foods BV, Netherlands, produces 65 000 portion-size cups of coffee cream/h. The thermoforming machine which feeds the packaging lines incorporates a H_2O_2 sprayer to sterilize the web and lidding material prior to formation of the cups; the material never comes into contact with a non-sterile atmosphere until the final seal has been made. JRR

48

[Evaluation of thermal efficiency of UHT installations. II. Calculation of sterilization values.] Bewertung der thermischen Wirksamkeit von UHT-Anlagen. II. Berechnung von Sterilisationswerten. Reuter, H.

Deutsche Molkerei-Zeitung 101 (43) 1616–1625; (45) 1701–1703 (1980) [22 ref. De] [Bundesanstalt für Milchwissenschaft, Kiel, Federal Republic of Germany]

In continuation of part I [see preceding abstr.], a detailed mathematical interpretation of F values is

presented, covering definition, lowest F value, detn. of F value, significance of F value, reference temp., conversion to a different reference temp., F values for different reactions, F_0 value (for 121.1°C reference temp.), and an example of a calculation of F value.

Numerous equations, graphs and tables are given. The calculation of W values is also explained, and their relationship with F values is shown. The advantages of F values over other sterilization values such as the W values are stressed. SKK

49

[Kinetic study of the formation of browning reaction products during UHT treatment of whole milk.]

Formalkinetische Betrachtung der Bildung von Bräunungsprodukten bei Anwendung des UHT-Prozesses auf Vollmilch

Konietzko, M.; Reuter, H.

Milchwissenschaft 35 (5) 276–277 (1980) [10 ref. De, en] [Inst. für Verfahrenstech. Bundesanstalt für Milchwissenschaft, Kiel, Federal Republic of Germany]

5-hydroxymethylfurfural (HMF), produced during direct UHT-treatment of milk, was measured as described by Keeney & Bassette [*Journal of Dairy Science* (1959) 42 945]. Bound HMF in heat-treated milk was released by heating in dilute oxalic acid solution. Kinetic relationship between HMF formation and temp. and duration of UHT treatment are discussed. MEG

50

[Possibilities of shortening fermentation of acidophilus milk.] Möglichkeiten zur Verkürzung der Fermentation bei Acidophilus-Milch.

Miller, B.; Puhan, Z.

Schweizerische Milchwirtschaftliche Forschung 9 (3) 49–56 (1980) [19 ref. De, fr, en] [Inst. für Lebensmittelwissenschaft, Eidg. Tech. Hochschule, Zurich, Switzerland]

Various methods were studied to shorten the fermentation time of a fast or a slow acid-producing strain of *Lactobacillus acidophilus* in inhibitor-free UHT milk. β -galactosidase, Pronase and trypsin were used for enzymic treatment of milk; and Lactovit A and Bios 2000 (Labor Wiesby, Niebüll, Federal Republic of Germany) bio-activators, commercial tomato juice and tomato puree, unhopped beer wort, tryptic peptone, and various pure amino acids, vitamins, salts and acids were tried as growth-promoters. Acidifying activity, titratable acidity, contents of L- and D-lactic acids, viscosity, lactose breakdown, bacterial counts and organoleptic tests were used in assessment. The best procedure involved addition of 1–5% tomato juice as source of growth substances for *L. acidophilus*, and addition of 500 p.p.m. peptone or 0.5 p.p.m. trypsin to the milk medium. Acidification time to pH 4.5 was thereby reduced from 55 to 24 h for the slow and from 31 to 19 h for the fast *L. acidophilus* strain. SKK

51

A method of and installation for pasteurizing and packaging milk.

PKL-Paper- & Kunststoff-Werke Linnich GmbH
UK Patent Application 2 052 949A (1981) [En]

The installation has provision for the sterilization, before use, of the pasteurizer with hot water at substantially atmospheric pressure, and of the packaging machine with superheated steam. The pasteurized milk is fed direct to the packaging machine, thus avoiding a storage tank which is not sterilized. The object is to prevent with simple means the re-infection of pasteurized milk to extend its storage life. FL

52

[New UHT plant of the Cooperative laitière des Quatre Cantons et du Cambresis.]

Anon.

Technique Laitière No. 946, 41-43 (1980) [Fr]

A completely mechanized UHT plant located at Le Quesnoy (59), France incorporates: an APV indirect heater with throughput of 10 200 l/h; a PKL aseptic packaging system utilizing 'brick' type cartons, capable of filling 10 080 l/h; 2 lines for grouping cartons into film-wrapped packs of 6 l; automatic equipment for assembling packs on pallets and placing the pallets

under a retractable cover; and a mechanized storage system. Reasons for selection of the various pieces of equipment are discussed; the 2 main aims were to improve productivity and reduce energy consumption. CDP

53

Improvements in and relating to sterilization.

Tetra Pak International AB

British Patent 1 582 060 (1980) [En]

The method for sterilizing packages for liquid foods, such as milk, involves the exposure of the packaging material (in an essentially closed chamber) to an atmosphere of a vapourized liquid sterilant (preferably H_2O_2) and a gas. The conditions in the chamber are such that some of the sterilant vapour condenses on the surfaces to be sterilized. After a suitable reaction time the sterilant is removed, e.g. by IR irradiation and the material is made into a tube which is then filled with the product. FL

54

Current process design concepts applicable to UHT.

(In 'International Conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332]) [Lecture]

Seiberling, D. A.

pp. 225-230 (1980) [4 ref. En] [Seiberling Ass. Inc., South Beloit, Illinois, USA]

The potential energy savings that would result from eliminating the need for refrigerated storage, problems of adapting UHT to high-capacity processes, and the application of existing concepts to UHT processing, are discussed. Capacity and flexibility at the filling stage and the provision of sterile surge tanks are important considerations in high-volume operations. It is suggested that ≥ 1 of the following concepts be incorporated in any high-volume UHT/aseptic packaging system: meter-based receiving; continuous standardization; dry ingredients mixing; product recovery system; and solid state control. [See also FSTA (1980) 12 12P2003 & 12 3P527.] CDP

55

No-Bac^(R) processing systems. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332]) [Lecture]

Carlson, V. R.

pp. 185-193 (1980) [En]

No-Bac processing systems, > 100 of which have been installed over the past 20 yr, are designed for aseptically processing both acid and non-acid products for subsequent packaging in aseptic systems. With the following more commonly used systems, general specifications, products being processed, and types of packaging systems to which they are linked, are discussed: Unitherms (No-Bac series 100 systems utilizing indirect Spiratherm heat exchangers); No-Bac series 200 & 600 (utilizing indirect Spiratherm heat exchangers). No-Bac series 1200, 1300 & 1400 (utilizing indirect Thermutator scraped-surface heat exchangers); and No-Bac series 1600 & 1700 (employing direct steam injection heating with a UHT heater and flash cooling with No-Bac Aro-Vac). CDP

56

Aseptic packaging of UHT processed products. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332]) [Lecture]

Hallstrom, B.

pp. 133-138 (1980) [11 ref. En] [Lund Univ., Lund, Sweden]

Aseptic packaging of UHT products in flexible containers of up to about 1 litre vol. is discussed. Examples of commercial aseptic filling systems employing various types of container are tabulated, and methods of container sterilization (simultaneous manufacture and sterilization, continuous sterilization of the web of container material, sterilization of the ready-to-fill container), and sterilization of the air, are outlined. CDP

57

Economic feasibility of UHT processing and aseptic packaging. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332]) [Lecture]

Benson, G. A.

pp. 169-182 (1980) [15 ref. En] [Dep. of Economics & Business, N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

The factors most likely to influence commercial success of UHT milk in the USA are discussed. It is suggested that consumer acceptance of UHT products will depend largely on the price in comparison with that of pasteurized products, and that commercial success will depend more upon the potential profits in processing, distribution and retailing. The cost of investing in processing and packaging equipment can be reduced if existing HTST plant can be modified. The effects of plant efficiency and economies of scale on processing costs are discussed, as are possible savings in distribution and retailing costs. CDP

58

Considerations necessary to provide for grade A sterile milk products in hermetically sealed non-refrigerated containers. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture] McGarrahan, E. T.
pp. 139–151 (1980) [En]

Legislation in the USA relating to pasteurized, ultra-pasteurized and sterile milk and milk products, as laid down by the FDA and the Grade A Pasteurized Milk Ordinance (PMO), is discussed in relation to import requirements, composition, nomenclature, heat treatment, and interstate distribution of UHT milk. Certain amendments will be necessary if the PMO is to provide for sterile non-refrigerated dairy products in hermetically sealed containers. Although this type of product is governed by the low-acid canned foods regulations, thereby assuring a safe product for consumption, the milk itself is best protected by adherence to the requirements of the PMO. CDP

59

Aseptic packaging in Pure Pak containers. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Wise, D. J.

pp. 217–222 (1980) [En]

6 criteria required of a modern aseptic packaging system to produce the desired long shelf life are considered under the following headings: Commercial sterilization of the product; Sterilization of all product contact surfaces of the filling machine; Sterilization of package upstream from the filling and sealing operation; Sterile environment for the filling and sealing process; The package should be provided with a suitable light barrier; and for a longer shelf life, incorporate a gas barrier in the packaging material. Advantages of aseptic packaging of UHT processed milk and milk products, and the possible future of these products in the USA, are briefly discussed. CDP

60

Some principles of aseptic packaging. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Bockelmann, B. von

Supplement, pp. 231–234 (1980) [En] [Tetra Pak International. Lund, Sweden]

General aspects of aseptic packaging, the Tetra Brik aseptic filling system, and types of low- and high-acid foods processed by UHT methods are discussed. CDP

61

Amylase activity in sterile spoiled pudding.

Barefoot, S. F.; Adams, D. M.

Journal of Food Science 45 (6) 1658–1661, 1668 (1980) [41 ref. En] [Food Sci. Dep., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

UHT sterilized canned [starch-based vanilla] puddings occasionally exhibit spoilage in the form of a dramatic loss of viscosity or thinning. Studies on a conc.

fraction of spoiled pudding indicate that thinning was due to a heat-resistant amylase. The concentrate was obtained by centrifugation and ultrafiltration of the thinned pudding. Ultrafiltration characteristics of the active agent indicate a mol. wt. of $1-30 \times 10^4$ dalton. The agent attacked starch with a decrease in iodine-binding capability and an increase in reducing units. Treatment of the concentrate with proteolytic enzymes decreased enzymic activity by 50%; treatment with sodium ethylene diaminetetraacetate decreased activity by 80%. Levels of starch and pH of the spoiled puddings were suitable for action of the amylase, and the enzyme was quite active at normal and elevated room temp. IFT

62

Improvements in or relating to steam injectors.
IN. DA. TE. AG

British Patent 1 574 808 (1980) [En]

The heater, particularly intended for UHT

sterilization of milk, comprises an injection chamber, and a stack of disks in the chamber. Each disk has a central hole forming a passage for the product to be heated, and is provided with channels running parallel to each other from the periphery to the central passage. During heating, steam is injected through the channels into the product flowing through the central passage. FL

63

International conference on UHT processing and aseptic packaging of milk and milk products.
[Conference proceedings]

United States of America, North Carolina State University, Department of Food Science; Dairy Research Inc., UDIA

iv + 230pp.; suppl. 231–249 (1980) [many ref. En]
Raleigh, North Carolina, USA

These proceedings contain papers presented at the conference held on 27–29 November 1979, arranged according to subject in 6 groups, i.e. chemical, nutritional and physical properties of UHT processed milk; microbiological aspects of UHT processing technology; engineering and regulatory aspects of UHT processing technology; practical applications and experience with UHT processed products; UHT processing equipment – specifications and performance; and aseptic packaging of UHT processed dairy products. 2 late papers are published in a separate supplement. All 22 individual papers in the proceedings are abstracted separately and may be found in the author index under **United States of America, North Carolina State University, Department of Food Science** [Aseptic Packaging Symposium]. FL

64

UHT milk – standards and quality assurance.

Zadow, J. G.

Australian Journal of Dairy Technology 35 (4) 140–144 (1980) [12 ref. En] [CSIRO Div. of Food Res., Dairy Res. Lab., Highett, Victoria 3190, Australia]

In this lecture, the author discusses some of the defects that can occur in UHT milk if adequate precautions are not taken during processing. In the first place, the raw milk used for UHT purposes must be free

from taints, and should have a pH > 6.7: it should be stable to a 74% (v/v) aqueous ethanol solution and should have a low count of bacteria, particularly psychrotrophs. Other constituents used in UHT dairy products (e.g. flavourings) should also be of high bacteriological quality. Packaging materials need to be sterilized before filling with UHT products, and they should form an effective seal against bacterial contamination and entry of excessive O₂. Careful attention needs to be paid to all aspects of plant operation, especially to homogenization seals and valves. Schemes for sampling and testing UHT products for sterility are outlined and methods for distinguishing between UHT and conventionally sterilized milk are discussed. MEG

65

[Stability of casein micelles during storage of directly or indirectly UHT-treated skim milk.] Zur Stabilität von Caseinmicellen während der Lagerung von direkt und indirekt erhitzter UHT-Magermilch.

Guthy, K.; Horak, P.

Milchwissenschaft 35 (10) 600-603 (1980) [19 ref. De, en] [Inst. für Milchwissenschaft & Lebensmittelverfahrenstechn., Tech. Univ. München-Weihenstephan, Federal Republic of Germany]

Using a laboratory UHT installation of 100 l/h capacity, 20-l batches of skim milk were UHT-treated at 145°C either (i) directly (4.6 s) or (ii) indirectly (1.9 s).

The treated milks were aseptically bottled in 0.3-l bottles and stored at room temp. for 24 wk. Every 2 wk 10-ml milk samples were renneted at 35°C with 0.2 ml rennet preparation (1 g dried Firma Hauser rennet dissolved in 200 ml distilled water); 0.2 ml portions of the mixture taken at 1 min intervals were fixed by addition of 9.8 ml 1% formaldehyde solution in physiological saline, and particle counts were carried out by a Coulter counter [see FSTA (1974) 6 12P1842]. It is concluded that casein micelles were more stable in indirect than in direct heated milk, due to the greater total heat input; aggregation of casein micelles in UHT milk can be considered as a physico-chemical reaction with marked similarities to coagulation by chymosin. SKK

66

[Role of proteolytic enzymes in dairy product manufacture.]

Netherlands, Nederlands Instituut voor Zuivelonderzoek

Zuivelzicht 72 (51) 1108-1109 (1980) [NI]

Towards the end of 1980 the Netherlands Institute for Dairy Research (NIZO) held a short information meeting at Ede on the role of proteases in dairy product manufacture. The following 4 papers presented at the meeting are summarized: Natural milk proteinase - occurrence and properties, by S. Visser. Proteolytic enzymes and UHT sterilized milk products, by F. M. Driessen. Milk-clotting enzymes, their action and possible applications in cheesemaking, by P. J. de Koning. Proteolytic enzymes of lactic acid streptococci and their significance for dairy product manufacture, by F. A. Exterkate. ADL

67

Inactivation of bacterial spores in products and on container surfaces. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332].) [Lecture] Denny, C. B.; Shafer, B.; Ito, K. pp. 82-88 (1980) [7 ref. En] [Nat. Food Processors Ass., Washington, DC, USA]

Development is described of suitable test methods for sterility of UHT milk and milk products, which will enable them to be distributed commercially in the USA as products not requiring refrigeration. Suitable strains of spores have been selected that show the greatest heat resistance in the product during processing, and strains have been selected for determining sterility of containers and closures used in aseptic canning systems,

and sterility within the system especially in filling and closing areas. Methods available for container sterilization include superheated steam, dry hot air, H₂O₂, ethylene oxide, and heat sterilization during manufacture of plastics containers; a suitable spore strain must be selected for testing for sterility in each case. CDP

68

Injector performance. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332].) [Lecture] Jones, V. A.

pp. 121-132 (1980) [7 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

The source of temp. and pressure fluctuations in steam injection heating systems, and effect of process variables (water flow rate to injector, holding tube pressure, pressure drop across injector, injector size and holding tube temp.) on these pulsations near the injector were investigated. Results indicated that the pre-injector pump was the main source of pressure pulsations in the holding tube; these pulsations increased with increase in pre-injector pressure. The small injector (0.375-inch throat diam.) produced greater pulsations than did the large injector (0.5-inch diam.). Steam pressure pulsations showed similar trends to those of holding tube pulsations. Low pressure drops across the injector were accompanied by more noise and vibration than were higher pressure drops, and temp. control was more difficult. Temp. fluctuation frequency was not well defined but its magnitude was correlated with pressure pulsation. CDP

69

The Stork Sterideal System. (In 'International conference on UHT processing and aseptic packaging of milk and milk products' [see FSTA (1981) 13 8P1332].) [Lecture] Rozema, K.

pp. 213-216 (1980) [En] [Product Div., Stork-Amsterdam, Netherlands]

The Sterideal is a completely closed, indirect heating system with a capacity of up to 16 000 l/h. It has 4 completely integrated units, namely a service module (milk surge tank, double-walled water and cleaning tank, centrifugal feed pump), heat-exchange sections of

stainless steel tubing coiled in a stainless steel housing, a high-pressure piston pump to feed the homogenizing devices, and fully automatic controls which operate pre-sterilization of the plant as well as controlling the UHT heating process. A schematic diagram of the system is presented and described. CDP

70

The role of heat resistant bacterial enzymes in UHT processing. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture] Adams, D. M.

pp. 89-105 (1980) [33 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina. 27607, USA]

The occurrence of heat-resistant lipases and proteases, their heat resistance, activity, and influence on product quality are reviewed. These enzymes can lead to off-flavours and possibly gelation in UHT-treated dairy products, and are not inactivated to any extent by UHT processes or subsequent storage.

Advantages and disadvantages of certain methods for controlling these enzymes, including a low-temp. inactivation process [see FSTA (1980) 12 8P1503] are briefly discussed. CDP

71

Engineering considerations in UHT Processing. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture]

Hallstrom, B.

pp. 108-120 (1980) [11 ref. En] [Lund Univ., Lund, Sweden]

Engineering problems involved in design and operation of a UHT plant up to the filling stage are discussed. These include: time/temp. programmes for the various types of direct and indirect UHT processes on the market; flow conditions, their relationship with heat transfer, pressure drop and burning-on; retaining the same water content in the treated as in the original milk when using direct heating processes; cleaning and maintenance of the plant, and avoidance of reinfection; and pre-sterilization of those parts of the plant that come into contact with the sterilized product. CDP

72

Potential market for UHT processed non-refrigerated dairy products. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture]

Grimes, A. R.

pp. 154-161 (1980) [En]

The market potential of UHT-processed non-refrigerated dairy products in the USA, and steps to be taken during the next 2 yr to convince manufacturers that these products are worthwhile, and to persuade consumers to accept them, are discussed. It is considered that if product, processing and packaging acceptance is not achieved within the next 2 yr, the potential market will be lost to imitation milk and dairy products. The importance of establishing an industry strategy in this field is emphasized. CDP

73

Industrial experience with UHT processing and products. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture] Goebel, H.

pp. 162-168 (1980) [En]

The development of UHT processing at the Milch-Union Hocheifel (MUH) is described. Sales of UHT milk from the MUH increased from 132 000 gal in 1973 to 15.84 million gal in 1979; % of sales of milk in 1-l consumer packs comprise low fat, 60%, 3.5% fat, 20%, skim milk, 10%, chocolate skim milk, 5%, and buttermilk, 5%; 0.25 l Tetra-Brik packs of various flavoured milks and orangeade are produced for supply to schools. The MUH operates 3 Stork-Sterideal installations and four 1-l and one 0.25-l Tetra-Brik filling machines. The importance is emphasized of

purchasing the right plant when establishing a UHT treatment system, and of employing well-trained, reliable staff. UHT products have a permitted shelf life of 6 wk in the Federal Republic of Germany. CDP

74

CREPACO Ultratherm DSH UHT/Sterilizing system for milk and milk products. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture]

Fowler, J.

pp. 194-200 (1980) [En]

The Ultratherm DSH system employs a Crepaco infusion heater for almost instantaneous direct heating of the product to the desired final temp., a short holder, an aseptic flash vessel, aseptic homogenizer, plate type regenerator for energy saving heat exchange between sterilized and untreated product, and controls (Foxboro Electronic Package Control System and Kay-Ray Continuous Level Systems) for product temp., levels, pressures, flow rates and flow diversion, and for sterilizing the equipment. System start-up, normal operation and provision of culinary steam are described. Components incorporated to sense and control process variables and display instruments for the system are listed. [See also FSTA (1980) 12 6P1031.] CDP

75

Alfa Laval UHT equipment. (In '*International conference on UHT processing and aseptic packaging of milk and milk products*' [see FSTA (1981) 13 8P1332].) [Lecture]

Nilsson, K.

pp. 201-204 (1980) [En]

Alfa-Laval has developed a total system of UHT processing. Both an indirect (Steritherm) and a direct (VTIS) system for UHT-treatment are available, each in capacities ranging from 2000 to 20 000 l/h, and either completely automated or semi-automated (M version); aseptic storage tanks are also supplied, with capacities ranging from 3500 to 20 000 l. After heat treatment by the Steritherm or VTIS system, the milk passes to the aseptic filler or to an aseptic storage tank. The 2 heating systems are each described in general terms. CDP

76

The DASI FreeFallingFilm™ UHT system. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Nahra, J. E.
pp. 205-212 (1980) [3 ref. En]

The DASI system consists essentially of allowing thin, laminar free-flowing films of pre-heated product to fall through a chamber containing saturated culinary steam under pressure; the walls of the chamber are air-cooled to prevent temp. of the inner surface from exceeding the max. temp. of the product. The product takes about 0.33 s to fall through the chamber, during which its temp. rises to UHT levels, and then leaves the unit and is flash-cooled to the pre-heated temp. The unit is able to treat >24 000 l/h. A completely automated

system incorporating the DASI unit, recently installed by Nuova Frau SpA in an Italian dairy, is described. Tests on whole and low-fat milk treated by this system showed that the level of albumin denaturation was similar to or lower than that obtained with other direct systems, and that thromboelastographic characteristics were similar to those of pasteurized milk. CDP

77

Some principles of UHT-processing. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Bockelmann, B. von
Supplement, 235-249 (1980) [En] [Tetra Pak International, Lund, Sweden]

The terms 'in-batch sterilization', 'in-flow sterilization', 'aseptic packaging' and 'final product' are defined. The various in-flow processing methods (direct heating of injection or infusion types, and indirect heating in plate, tubular or scraped surface heat exchangers) are outlined, and their advantages listed. Automated regulating devices for use in the cleaning, pre-sterilization and production stages of in-flow sterilizers are discussed. CDP

78

Nutritional and biochemical characteristics of UHT milk. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Renner, E.
pp. 21-52 (1980) [134 ref. En] [Dep. of Dairy Sci., Justus-Liebig-Univ., Ludwigstrasse 23, Giessen 6300, Federal Republic of Germany]

Changes occurring in nutrients (protein, fat, minerals, vitamins) during UHT processing and subsequent storage of milk are reviewed. Effects of indirect and direct UHT processing, pasteurization and sterilization on some nutrients are compared. It is concluded from a consumer poll that the high nutritive value of UHT milk is not yet appreciated by many consumers. CDP

79

Effect of UHT processing and storage on the chemical and physical properties of UHT milk. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Hansen, A. P.; Swartzel, K. R.; Earley, R. R.
pp. 53-66 (1980) [55 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Physical and chemical changes occurring in UHT-treated milk are reviewed, and experimental work undertaken to monitor chemical and physical changes during storage of UHT milk are reported. Milk samples pre-treated at 78°C, then UHT-treated by steam injection at 138°, 143° or 149°C for 3.4, 6.9 or 20.3 s were most acceptable when stored at 4°C; at room temp., acceptable flavour was noted between wk 4 and 20 for milk treated for 6.9 s and between wk 8 and 20 for that treated for 20.3 s, whereas milk treated at 149°C for 3.4 s was acceptable for only 1-2 wk. Samples heated for 20.3 or 3.4 s showed an increase in dissolved O₂ during storage, and acid degree values increased linearly during storage at 24 and 40°C, but <0.5% of samples were judged to be rancid. Effects of storage on physical properties were studied from measurements of ΔA [FSTA (1981) 13 1P44] and rheological behaviour; onset and rate of gelation were inversely related to residence time during heat treatment and directly related to fat content of the product. CDP

80

An introduction to the ultra-high-temperature processing of milk and milk products. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Burton, H.

pp. 1-20 (1980) [35 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

In this introductory paper to the conference, the principles of UHT processing, types of UHT sterilizing plant, aseptic filling systems, quality of UHT-processed milk and unsolved problems relating to UHT processes (flavour, heat-resistant enzymes, deposit formation and bacteriological control) are discussed in general terms. CDP

81

An enzymatic approach to flavor modification. (In *'International conference on UHT processing and aseptic packaging of milk and milk products'* [see FSTA (1981) 13 8P1332].) [Lecture]

Swaigood, H. E.; Janolino, V. G.; Sliwowski, M. X.
pp. 67-76 (1980) [10 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Progress made in the detailed examination of physical, chemical and kinetic characteristics of sulphhydryl oxidase is summarized. Aspects discussed are: source of the enzyme and its purification [see FSTA (1980) 12 2P244]; catalytic characteristics, including oxidation of thiols [see FSTA (1981) 13 1P99]; physical characteristics pertinent to its utilization (notably its

large particle size); and immobilization as a means of industrialization of the enzyme [see FSTA (1980) 12.2P240 & (1979) 11.9P1669]. CDP

82

Sterilization.

Slade, E.

Food Processing Industry 49 (589) 41-43 (1980) [3 ref. En]

Consideration is given to: UHT sterilization; methods of UHT treatment; and to the following sterilization systems: Stork Sterideal UHT system; Vacutherm instant sterilizer (a direct heating system); the Steritherm indirect heating system; Ultramatic, Uperisation and Crepaco Rota-Pro systems of continuous sterilization; Alfa-Laval aseptic tanks; and Stork Hydromatic sterilizers. VJG

83

Express Dairy speed up cream packaging.

Anon.

Food Processing Industry 49 (587) 26-27 (1980) [En]

A description is given of the long life, cartoned, single cream, filling line at Express Dairy Foods Ltd's factory at Crediton, Devon, UK. A combibloc CF 6000 aseptic filler has been installed to keep pace with increased demand. The new line also includes automatic tray forming and packing, and shrink wrapping equipment designed to handle the Combibloc's output of up to 6000 cartons/h. VJG

84

Effects of ultra-high-temperature pasteurization on milk proteins.

Douglas, F. W., Jr.; Greenberg, R.; Farrell, H. M., Jr.; Edmondson, L. F.

Journal of Agricultural and Food Chemistry 29 (1) 11-15 (1981) [26 ref. En] [Eastern Reg. Res. Cent., USDA, Philadelphia, Pennsylvania 19118, USA]

UHT pasteurization of skim milk (148°C for 3 s) has been found to inactivate effectively foot and mouth disease virus. For detn. of the effect of UHT pasteurization on milk proteins, composition and properties of proteins from milk after this treatment were compared with those from conventional HTST pasteurized (71.7°C for 15 s) and raw skim milks. Vacuum-dried-acid-precipitated caseins and freeze-dried-dialysed whey proteins were prepared from each product. Functional properties of casein such as solubility, viscosity, emulsifying capacity, and electrophoretic mobility were compared. For both casein and whey proteins, compositional comparisons were made among molar ratios of amino acids, total protein, and chemically available lysine. Solubility of milk caseins was reduced by UHT pasteurization. Whey protein N analyses show significant protein denaturation. No significant losses in nutritive value were indicated, and differences in viscosity and emulsification capacity small. AS

85

[Effects of mechanical and heat treatments on various milk products.] Einflüsse mechanischer und thermischer Behandlungen auf verschiedene Milchprodukte.

Kessler, H. G.

Deutsche Molkerei-Zeitung 101 (49) 1820, 1822-1824, 1826-1828 (1980) [6 ref. De] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

This paper summarizes recent work at the Weißenstephan Institute on factors influencing the extent of milk homogenization; on effect of homogenization and preheating on stability of yoghurt; on mechanical effects of pumping on cream; and on restriction of duration and temp. of UHT treatment. SKK

86

[Chemical changes occurring during storage of UHT milk.] Chemisch bedingte Veränderungen bei der Lagerung von H-Milch. [Lecture]

Lechner, E.

Molkerei-Zeitung Welt der Milch 32 (46) 1383-1387 (1978) [17 ref. De] [Chem. Inst., Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

This lecture presented at the annual meeting of dairying consultants in Weißenstephan in Oct. 1978 reviews the subject with particular reference to effects of UHT treatment and storage of milk on its proteins; effects of UHT conditions and storage temp. on protein degradation and gelation; activities of native and bacterial proteinases (*Pseudomonas fluorescens*); and possibilities of inhibiting gelation in UHT milks. SKK

87

[Evaluation of UHT milk quality in relation to technological variables.] Beurteilung der H-Milch-Qualität in Abhängigkeit von technologischen Varianten.

Töter, D.

Österreichische Milchwirtschaft 36 (5) 73-77 (1981) [De]

Results of experiments carried out on the production of UHT milk with 3.5% fat are briefly discussed, covering organoleptic quality, oxygen content and its effects on milk quality, stability of ascorbic acid and tocopherol, contents of free fatty acids, hydroxymethylfurfural and available lysine, sediment formation, creaming and storage. FL

88

[New multiple-line palletizing installation for UHT milk.] Neue Mehrlinien-Palettieranlage für H-Milch.

Anon.

Deutsche Molkerei-Zeitung 101 (50) 1875-1876 (1980) [De]

89

Tetra Pak.

Anon.

Tetra Pak No. 53, 52pp. (1980) [En]

This issue deals with many aspects (economic, agricultural, industrial) of the countries belonging to the ASEAN (The Association of South-East Asian Nations) including dairying aspects: p.19, outlining the operation of a dairy in Bandung, Indonesia producing UHT milk, plain and flavoured, in Tetra Brik cartons from fresh and reconstituted supplies; pp.22-28, giving data on the organization of dairy farming and UHT milk production in Malaysia; pp.34-37, concerning dairy farming and milk processing in Thailand, and pp.39-49, covering production of a variety of long-life beverages including chocolate, strawberry and coffee milks, marketing, and milk for school children in Singapore. FL

90

Aseptic bag-in-box packaging.

Orbell, J. A.

Food Technology 34 (9) 56-57 (1980) [En] [Scholle Corp., 200 W. North Avenue, Northlake, Illinois 60164, USA]

In the USA, the FDA allows aseptically processed foods to be packaged in various rigid and non-rigid containers, the type of container depending on the acidity of the food; some examples are quoted. The only non-rigid container currently accepted by the FDA for high-acid foods ($\text{pH} \leq 4.5$) is the aseptic bag-in-box package; this package consists of a flexible plastics bag (having high strength and excellent barrier properties) contained within a rigid corrugated paperboard container. The bag is fitted with a special closure that allows filling by machine on a production line and provides ease of opening and pouring. This paper traces the development of the aseptic bag-in-box packaging system, briefly describes the system and outlines its benefits. The sterilized food product may be filled into the bags (sterilized by γ -radiation) by hot or cold filling. However, the sterilization process for products destined for hot filling usually results in extensive heat damage. Products for cold filling are heated to 120-130°F, pumped through a scraped-surface heat exchanger in which the product is heated to $\geq 190^\circ\text{F}$ for 1-5 min, and cooled in ≥ 2 heat exchangers to 85-90°F before packaging; this process minimizes both heat damage and container cooling problems. The bags used are a laminate of polyethylene and metallized film (not foil), the polyethylene being the food-contact surface. A shelf-life of 1-1.5 yr can be obtained, depending on package size and product. Benefits claimed for aseptic bag-in-box packaging include: min. degradation of heat-sensitive ingredients; no refrigeration required; low wt.; stable pallet loads; low packaging material costs. JA

91

[Sterile filling of juices and concentrates in large bags.] Sterilabfüllung von Säften und Konzentraten in Grossbeuteln.

Reintjes, H.-J.

Flüssiges Obst 47 (6) 254-255 (1980) [De]

Aseptic filling of fruit and vegetable juices and concentrates in large capacity plastics bags is described.

A multi-ply polyethylene-saran compound film, gas permeability 2.3 ml $\text{O}_2/24 \text{ h m}^2$ at 1 bar (reduced in air to 20%) was selected. It is available in 3 l-1000 l bags. The filling system and stacking bags in cartons (designed for 60 gal or 225 l contents, 2 cartons on 1 Europool pallet), and a model plant for aseptic filling of 225 l bags are described, with illustrations. RM

92

Staphylococcal food poisoning by consumption of sterilized vanilla custard.

Beckers, H. J.; Coutinho, R. A.; Jansen, J. T.; Leeuwen, W. J. van

Antonie van Leeuwenhoek 46 (2) 224-225 (1980) [En] [Lab. for Zoonoses & Food Microbiol., Nat. Inst. of Public Health, PO Box 1, 3270 BA Bilthoven, Netherlands]

In July 1978, 26 people suffered gastric disorders (lasting 4-72 h) after eating UHT custard. *Staphylococcus aureus* strains with an unusual phage pattern, producing enterotoxin A, were isolated from the custard, from patients' faeces, and from the nose of an employee working in the department where the custard was aseptically packaged under pressure by filtered air. It was concluded that some packages were contaminated after UHT treatment, either by this employee or by leakage of an air filter. ADL

93

[Competition behaviour among producers of UHT-milk.] Wettbewerbsverhalten beim H-Milch-Angebot. Ramm, G.

Milchwissenschaft 33 (5) 277-280 (1978) [11 ref. De, en] [Inst. für Landwirtschaftliche & Marktforschung der Bundesforschungsanstalt für Landwirtschaft Braunschweig-Völkenrode, Federal Republic of Germany]

Competition among the 6 biggest producers of UHT milk in the Federal Republic of Germany was studied by analysis of price elasticities with a dynamic econometric model. Of the many oligopoly models available, two were selected: the Cournot-Nash solution, representing equilibrium without cooperation among producers; and the collusion solution, representing equilibrium in a situation of cooperation. The study indicated that competition among UHT milk producers was generally non-cooperative. ADL

94

[Cost and marketing aspects of the market for UHT milk.] Der H-Milchmarkt unter Kosten- und Marketingaspekten.

Drews, M.; Longuet, D.

Deutsche Molkerei-Zeitung 102 (12) 350-356, 361-364 (1981) [10 ref. De] [Inst. für Betriebswirtschaft & Marktforschung, Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

This is essentially a summary of the results of a study of the UHT milk market in the German Federal Republic carried out for the International Dairy Federation [see FSTA (1981) 13 3D22]. ADL

95

Hydrolysis of milk proteins by microbial enzymes. Gebre-Egziabher, A.; Humbert, E. S.; Blankenagel, G. *Journal of Food Protection* 43 (9) 709-712 (1980) [21 ref. En] [Dep. of Dairy & Food Sci., Univ. of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 0W0]

Raw skim milk was incubated at 7°C for 15 days after inoculation with 6 strains of *Pseudomonas* spp., previously isolated from raw milk. Polyacrylamide gel electrophoresis showed that all 6 strains hydrolysed milk proteins. After 9 days storage at 7°C, losses of κ -, β - and α -casein were 61-91, 62-89 and 19-76%, resp., and after 15 days there were no traces of κ - or β -casein and a considerable loss of α -casein. Most of the isolated psychrotrophs required extended incubation periods for hydrolysis of the whey proteins. When 1 strain (isolate 22) was inoculated into commercially processed UHT milk, cell counts increased from 1300 to 27 000/ml within 2 days at 7°C. At this time, 26 proteinase units were present (1 proteinase unit being defined as the amount of enzyme producing 1 μ g acid-soluble tyrosine/ml enzyme solution/24 h at 40°C). A bitter flavour appeared after 4 days storage, when the cell count reached 2.5 million/ml and the enzyme level was 64 units. Addition of 9.8 enzyme units to UHT milk caused a bitter flavour within 28 days at 7°C and in <3 days at room temp. (21°C); 2 units produced bitterness in 7 days at room temp. DMK

96

Effects of ultrahigh temperature steam injection processing on composition of carbonyls in milk fat. McCarty, W. O.; Hansen, A. P. *Journal of Dairy Science* 64 (4) 581-587 (1981) [19 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh 27607, N. Carolina, USA]

Fresh raw milk was preheated to 74°C, homogenized, heated by steam injection to 140.5°C for 4.4 s, vacuum cooled to 74°C and then cooled further to approx. 4°C. Fat was extracted from 1500-ml samples of UHT and raw milk and carbonyls were reacted with 2,4-dinitrophenylhydrazine. Total carbonyl concn. was decreased by 12.3% ($P < 0.05$) in UHT milk and monocarbonyls were slightly decreased. Separation of monocarbonyls on a column containing Celite 545 and adsorptive magnesia demonstrated that UHT treatment led to an increase in methyl ketone concn. Gas chromatograms of the methyl ketone compositions of raw and UHT milk were similar, 2-butanone being the major ketone in each case, but 2-heptanone was missing from UHT milk. Gas chromatograms showed that UHT milk contained the saturated aldehydes found in raw milk plus some additional ones which may have been heat-induced. Several quantitative differences were suggested. TLC analysis confirmed some results of the GLC studies, although some compounds may have been present in quantities too small to detect by TLC. LMM

97

[Study of production of concentrated sterilized milk with UHT treatment and aseptic packaging in cartons.]

Vertinskii, Yu. K.; Tikhomirova, G. P.; Piskunov, E. G. *Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti* No. 48, 27-31 (1979) [Ru] [VNIIMP, Moscow, USSR]

The experiments were carried out in sterilized milk production lines of the Cherkizov dairy factory. Milk of 18°T titratable acidity with 3.5% fat and passing the alcohol test at 75% ethanol was pasteurized at 75°C for 30 s, concentrated to 25.5% DM on a Wiegand vacuum evaporator, 0.3% sodium citrate was added, pH was brought to 6.6, and the concentrated milk was passed through the VTIS UHT installation. The conditions were: pre-heating to 90°C, steam sterilization at 143°C for 4 s, cooling to 80°C in a vacuum chamber, homogenization at 12 MPa, cooling to 20°C in plate heat exchanger, and aseptic transfer to Tetra-Pak-aseptic installation for packaging as for sterilized liquid milk. Packaged samples were held for up to 2 months at 7°C or at uncontrolled room temp., and contents of fat and DM, pH, titratable acidity, density, stability in alcohol test, heat stability at 120°C, homogenization effect and viscosity were determined initially and after different periods of storage, and organoleptic tests were carried out. It is concluded that the UHT treatment and Tetra-Pak-aseptic packaging procedure used for sterilized liquid milk were also suitable for concentrated sterilized milk, except that homogenization at 12 MPa did not prevent fat separation on prolonged storage; otherwise the packaged product stored satisfactorily at both temp. for up to 2 months. SKK

98

[Quality criteria of UHT milk and fresh milk from the consumer's viewpoint.] Qualitätskriterien der H-Milch und Frischmilch aus der Sicht des Verbrauchers. Kess, U.

Österreichische Milchwirtschaft 36 (6) 93-98 (1981) [1 ref. De]

This is a summarized version of the author's thesis abstracted in FSTA (1980) 12 5P989. SKK

99

A note on an unusual feature found in UHT milk. Bushnell, A. C.

Journal of the Association of Public Analysts 18 (2) 67-68 (1980) [En] [County Analyst's Dep., County Hall, Preston, UK]

A sample of commercial UHT milk was found to be sterile and have a normal proximate composition, with slightly raised acidity (0.21% as lactic acid). Analysis of the sugars by dual-run TLC (solvent 70% n-propanol, 10% ethyl acetate and 20% water) and confirmation using yeast fermentation methods showed that the milk had undergone lactose hydrolysis, the sugars analysis being lactose 1.9%, glucose 1.3% and galactose 1.3%. Subsequent samples from the same plant have been normal; the source of the β -galactosidase is not known. JRR

100

[Jumbo-Rolls from Tetra Pak: 9500 milk packages in a single operation.] Jumbo-Rolle von Tetra Pak: 9500 Milchpackungen in nur einem Arbeitsgang.

Anon.

Molkerei-Zeitung Welt der Milch 35 (18) 551-552 (1981) [De]

A new 'Jumbo' roll of packaging material for use with Tetra Brik systems comprises 9500 (one-litre) or > 20 000 (0.2-litre) packs and enables the roll changing frequency to be reduced to 2.5 and 4 h resp. with attendant advantages of less handling and savings in time and storage space. Suitable equipment for the handling of the rolls including their conveyance and insertion into the packaging machines is described. FL

101

[Aseptic packaging of milk products in cups using H_2O_2 .] Reinfektionsfreies Abfüllen von Milchprodukten in Bechern mit H_2O_2 .

Hahn, G.

Deutsche Molkerei-Zeitung 102 (16) 518-519 (1981) [De]

This paper outlines the operation of the Gasti cup-packaging machine in which reinfection is prevented by sterilizing packaging material (polystyrene) surfaces with 30% H_2O_2 and its removal at 80-90°C. The machine works on a closed system principle, the tunnel being kept at pressure above atmospheric by sterile air, and the sections for packaging-material sterilization, filling, and closing are cleaned and sterilized in place in a programmed operation. SKK

102

[Dairy plant Wartberg specializes in UHT products.] Molkerei Wartberg: H-Milch-Spezialbetrieb.

Füssl, A.

Österreichische Milchwirtschaft 36 (9) 165-166 (1981) [De]

A brief account is given of the packaging of UHT milk and milk specialties at Wartberg dairy plant, Austria, using an Alfa-Laval sterilizer and 4 Tetra Pak packaging machines with a total output of about 21 000 packs/h in 0.25, 0.50 and 1-litre sizes. The product range includes 0.5% fat milk enriched with 1.5% protein, low-fat chocolate milk, milk coffee, 10% fat coffee cream (in 14 g packs) and 32% fat cream. FL

103

Characterization of *Bacillus* species isolated from spoiled ultrahigh temperature processed milk.

Westhoff, D. C.; Dougherty, S. L.

Journal of Dairy Science 64 (4) 572-580 (1981) [22 ref. En] [Dep. of Dairy Sci., Univ. of Maryland, College Park, Maryland 20742, USA]

16 *Bacillus* strains were isolated from a total of 9 spoiled UHT milks. They closely resembled strains of *B. subtilis* and *B. cereus*. However, most were atypical in

one or more biochemical or physiological traits. Spore crops were prepared from 4 of the isolates, and their thermoresistance was determined. D values (time at 100°C to destroy 90% of the population), obtained in water and reconstituted dried skim milk, ranged from 3.10 to 7.68 min and z values (temp. change causing thermal death curve to traverse 1 log cycle) ranged from 5.6° to 8.8°C. All strains isolated were mesophilic with temp. optima between 37° and 45°C. Two strains could grow at 10°C, but none could grow at 5° or 60°C. The possibility of these isolates surviving the heat treatment to which the milk was exposed seems remote. Spore protection in milk stone build-up, after the milk has left the sterilizer, is suggested. MEG

104

[Hot air sterilization of cup-filling installations.]

Heissluft - Entkeimung bei Becher-Abfüllanlagen. Ammann, S.

Deutsche Molkerei-Zeitung 102 (16) 521-524 (1981) [De]

This paper outlines the principles of heat destruction of microorganisms using literature data (references not given), and describes the construction (diagrammatically presented) and operation of an unnamed fully automated installation for aseptic cup filling using hot air sterilization developed by the firm with which the author is connected. Such an installation has been in operation for 2 yr producing daily 50 pallets of 2400 cups of UHT cream; tests on 4 cups from each pallet detected 2-3 non-sterile cups/25 working days. SKK

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FAB 10

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H. BROOKES
EDITOR

1

[*Limulus* amoebocyte lysate test for assessment of good manufacturing practice in food processing.] Zur Bewertung der Hygiene bei Gewinnung und Verarbeitung von Lebensmitteln mit dem Limulustest. Terplan, G.; Bierl, J.; Grove, H.-H.; Zaadhof, K.-J. *Archiv für Lebensmittelhygiene* 32 (1) 15-19 (1981) [10 ref. De, en] [Inst. für Hyg. & Tech. der Lebensmittel Tierischen Ursprungs, Schellingstrasse 10/111, D-8000 Munich 40, Federal Republic of Germany]

The previously described *Limulus* test [FSTA (1976) 8 6P1174] was examined as a control method for good manufacturing practice in food processing and for information on the hygienic quality of the raw material. It was applied to raw, pasteurized and UHT treated milk, raw and cooked minced beef and turkey, and to turkey carcasses before and after cutting, packaging of cuts (in "foodtainer") and vacuum packaging. Tabulated results for *Limulus* titres and counts of total bacteria, pseudomonads + aeromonads, and Enterobacteriaceae showed that the test could be used for detection of Gram-negative bacteria in raw milk both before and after heat treatment, for the assessment of the hygienic quality of minced meat and for detection of spoilage organisms on carcass surfaces. *Limulus* titres were unchanged after UHT treatment of milk, and reduced by a power of 10 or unchanged after cooking of minced meat. In examination of carcass surfaces, *Limulus* titres during storage increased with the count of Gram-negative bacteria, further investigations are needed regarding the practical application of the test (e.g. establishing guide values). RM

2

High-volume unit for aseptic packaging.

Anon.

Food Engineering International 5 (10) 35-36, 21, 23, 25 (1980) [En, fr, de, es]

Aseptic packaging is described of single-serve sterile coffee cream cups with the Servac 78AS machine, made by the Höflinger & Karg Division of Robert Bosch GmbH. Cup film and lidding film material is cleaned by combined high-pressure spraying/chemical sterilization, avoiding the need to use heated H₂O₂ solution. Cups are formed-filled-and-sealed, and packed either into plastics bags (12 cups/bag) for retail sale or in bulk for institutional use. A machine in use at a Dutch dairy requires 1 operator and 3 attendants to produce 65 000 cups/h. DIH

3

UHT milk: production, quality, and economics.

[Review]

Kosaric, N.; Kitchen, B.; Panchal, C.; Sheppard, J. D.; Kennedy, K.; Sargant, A.

CRC Critical Reviews in Food Science and Nutrition 14 (2) 153-199 (1981) [46 ref. En] [Dep. of Chem. & Biochem. Eng., Univ. of Western Ontario, London, Ontario, Canada]

The review deals with UHT milk processing, economics, packaging, and quality maintenance. Various methods of processing are covered in detail. A sample system was considered for material and

energy balances. A major factor in UHT milk technology is the economics of the process adopted. This is considered for the major processes currently in operation. Packaging and handling of UHT milk is of vital importance for the maintenance of the quality and flavour of the milk. A review of the different packaging systems describes the advantages and disadvantages of each one. The review is divided into the following sections: major direct and indirect processes; energy requirements and economics; material and energy balances for fluid milk processing, storage, and distribution systems: aseptic packaging; and quality effects. AS

4

[Enzymic proteolysis in UHT milk products.

I. Production of proteinases by bacteria during their growth in milk.]

Driessen, F. M.

Zuivelzicht 73 (31/32) 656-658 (1981) [5 ref. Nl, en]

[Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Milk was treated by a UHT process (5 min at 105°C), then inoculated with *Pseudomonas fluorescens* 22F (55 000/ml milk) and stored at 7°C. At intervals it was tested for proteolysis, using a specially developed method to estimate the % of para-κ-casein compounds formed. Proteolysis was not observed until after 72 h, at the end of the growth phase of the bacteria, when the bacterial count was over 10 million/ml. Marked proteolysis was observed, however, after ≥ 0.05% of a *P. fluorescens* culture (500 000/ml), which had attained full growth at 20°C, was added to the milk. This suggested that contamination due to residues in tanks or defective cooling could render milk unsuitable for UHT products, even though its bacterial count might be low. In further experiments, milk which was kept for 5 days at 4-6°C before UHT treatment showed a marked increase in non-protein N (indicating proteolysis by bacterial enzymes) during subsequent storage at 20°C. By contrast there was only a slight increase in non-protein N (due probably to the natural alkaline milk proteinase) in milk which had been UHT-treated when fresh or after only 2 days' storage at 6°C. ADL

5

[Cup-filling installations using pre-formed cups and ultraviolet light sterilization of packaging material.]

Becher-Abfüllanlagen für vorgefertigte Becher mit UVC-Entkeimung des Verpackungsmaterials.

Möller, E.

Deutsche Molkerei-Zeitung 102 (16) 520 (1981) [De]

This paper outlines the operation of Hamba cup-filling machines using high-output UV emitters manufactured by BBC and working at 100-200 mW/cm². Lids are automatically presented individually for exposure of 2 s at a distance of 40 mm, and batteries of 3 emitters are used to sterilize the entire inner surface of cups. The operation chain from the cup point to the closure point takes place in a tunnel kept sterile by a stream of sterile air at 30-40°C (to

prevent moisture condensation). All components are cleaned and sterilized in-place. Under these conditions, the following storage lives may be achieved: stirred fruit yoghurt 42 days, whipping cream 30 days, UHT cream 12 wk, and pudding/whipped cream desserts 24 days. SKK

6

[Quality aspects of UHT milk.] Qualitätsaspekte zur H-Milch. [Lecture]

Renner, E.

Landwirtschaftliche Forschung, Sonderheft No. 36, 61-68 (1980) [10 ref. De, en, fr] [Milchwirtschaftliche Abteilung der Justus Liebig-Univ. Giessen, Bismarckstr. 16, D-6300 Giessen, Federal Republic of Germany]

Compared with traditional sterilization at 115-120°C for 10-20 min, UHT treatment at 140-150°C for a few seconds represents a small thermal stress. The intensity of the cooked taste that results from the splitting of amino acid sulphhydryl groups depends on treatment conditions and is reduced during storage. During storage, milk fat may be hydrolysed since the extracellular lipase of *Pseudomonas* is not completely inactivated by UHT treatment. Hydroxymethylfurfural, a product of the Maillard reaction, can also influence taste during storage. Denaturation of whey proteins during indirect UHT treatment is greater than during direct treatment, but it is not so marked as in traditional sterilization; 3-4% of lysine is lost during UHT treatment compared with 1-2% in pasteurization and 6-10% in sterilization. Losses in B vitamins and vitamin C are mainly 10-20%. [See FSTA (1982) 14 1A23.] BWH

7

Direct sterilization of heat-sensitive fluids by a free-falling-film sterilizer.

Nahra, J. E.; Westhoff, D. C.

Food Technology 34 (9) 49-55, 57 (1980) [5 ref. En]

[DASI Inc., 5454 Wisconsin Avenue, Chevy Chase, Maryland 20015, USA]

A new direct heating sterilizer, capable of operating at up to 6000 US gal/h, is claimed to produce UHT milk indistinguishable from pasteurized milk. The milk enters a steam chamber through thin slits in horizontal feed tubes forming thin, laminar, free falling films.

Advantages claimed over existing sterilizers are less physical stress on milk particles, absence of deposit build up, more consistent product quality and no gelation or sedimentation on storage. With fixed holding time calculated at 1.79 s sterility was achieved at temp. > 132.2°C (270°F). Triangle tests indicated no significant difference with pasteurized milk. Tests on culture substrate stability using yoghurt and lactic starter cultures showed no major deleterious effects. Alkaline phosphatase, lipase, protease and xanthine oxidase were all inactivated. Only alkaline phosphatase reactivated on storage. Denaturation of whey proteins especially β -lactoglobulin was less than in other UHT sterilizers. Test on coagulability showed variations from raw milk but were not conclusive as regards suitability for cheesemaking. FL

8

[Aseptic packaging. Example of the necessary interaction of food technology and packaging technology.] Aseptische Verpackung - ein Beispiel für das notwendige Zusammenwirken von Lebensmittel- und Verpackungstechnologie. [Review]

Buchner, N.

Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik 30 (7) 301-304 (1979) [51 ref. De]

Aspects covered in this review include: functions of packaging; basic principles of aseptic packaging; microbiological aspects; aseptic filling methods; advantages of aseptic packaging over thermal sterilization after filling of the pack; and likely developments in methods and equipment used in aseptic filling, sterilization of packing materials, etc. AJDW

9

[Selection of filter materials for sterilization of air during aseptic canning of foods.]

Razvozhevskaya, Z. S.; Nariniyants, G. R.; Nikolaeva, S. A.; Filatov, Yu. N.

Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 1, 22-23 (1981) [Ru] [VNIIPK, USSR]

The study involved 7 filtering materials, of which FPFS material (based on polytrifluorostyrene) gave the best results, micrococci, yeast cells, mould spores and various bacilli being used as test organisms. The FPFS can be steam sterilized for re-use, but should then be thoroughly dried, since its sterilizing effect (as that of all the materials studied) dropped drastically when moist. FPFS is to be incorporated into lines for aseptic canning of tomato paste and fruit purees. STI

10

[Effect of raw milk quality on microbiological quality of UHT milk.]

Slottova, A.

Zbornik Prac Vyskumneho Ustavu Mliekarskeho v Ziline 1977-1978, 27-37 (1980) [Sk, ru, en, de]

[Vyskumny Ustav Mliekarsky, Zilina, Czechoslovakia]

During 1978 in the Bratislava (Czechoslovakia) dairy factory, 60 samples of raw milk were obtained from delivery tanks, 26 samples of pasteurized milk from production tanks, and 236 samples of UHT milk from the production line. Microbiological tests include the following results for raw and pasteurized milk resp: total bacterial count, 9.81 million and 7700/ml; coliform count, 260 000 and 25/ml; yeasts, 45 200 and 120/ml; *Geotrichum* spp., 200/ml and absent; other fungi, 5/ml and absent; aerobic sporeformers, 40 and 10/ml; and anaerobic sporeformers, 2.0 and 2.2/ml. 118 of the 236 UHT-sterilized milk samples were examined directly, and 118 were examined after storage for 1 wk at room temp.; 48 (40.7%) and 42 (35.6%) of the samples resp. contained bacteria (71.4% micrococci, 16.7% rods, and 11.9% sporulating rods); aerobic sporeformers were not detected in samples examined directly, but were found in 21 (17.8%) of the stored samples. The need to improve sterilized milk quality is emphasized. SKK

11

Aseptic processing of foods comprising sauce and solids.

Hersom, A. C.; Shore, D. T.

Food Technology 35 (5) 53-62 (1981) [5 ref. En]
[Londreco Ltd., Nestle Products Tech. Assistance Co. Ltd., Nestles Avenue, Hayes, Middlesex UB3 4RG, UK]

The application of HTST processes followed by aseptic filling to foods containing particles has been limited by the following problems: limiting effect on particle size of the heat penetration rate into the solids; possibility of enzyme survival; difficulty of handling fragile solids without damage; and lack of suitable hardware for processing and filling such foods. This paper describes the development of a process and equipment which overcome these problems, consideration being given to preliminary laboratory studies, construction of a pilot plant, evaluation of the process, development of a commercial system, use of automated control, and possible future developments. The paper contains various photographs, diagrams and graphs including 8 detailed flow diagrams showing the sequence of operations in the commercial aseptic processing system, i.e. presterilization, heating, liquor injection cooling, draining, sauce transfer and mixing, emptying, and filling. The commercial system has been used to produce soups containing meat and vegetables for the German market. JA

12

Furfural accumulation in stored orange juice concentrates.

Kanner, J.; Harel, S.; Fishbein, Y.; Shalom, P.

Journal of Agricultural and Food Chemistry 29 (5) 948-949 (1981) [16 ref. En] [Agric. Res. Organization, Volcani Cent., Bet Dagan, Israel]

The mode of furfural accumulation was determined in aseptically filled containers of single-strength orange juice and concentrate during storage at 6 different temp. Results showed that furfural accumulated in orange juice more rapidly than in concentrates of 34, 44, and 58°Brix. There was 4 times the amount of furfural in orange juice (12°Brix) than in concentrate (58°Brix) stored at 17°C for 100 days. A peak accumulation of furfural which was formed immediately after processing in high juice concentrates (58°Brix) was eliminated by increasing deaeration. In concentrates evacuated to 40 mmHg, furfural concn. increased gradually during storage at a rate dependent on storage temp. and degree of juice concentration. AS

13

[Enzymic proteolysis in UHT milk products.**1. Production of proteinases by bacteria during their growth in milk.]**

Driessen, F. M.

Voedingsmiddelentechnologie 14 (15) 18-20 (1981) [5 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See FSTA (1982) 14 1P39.

14

Microbiological aspects of aseptic packaging.

Ayres, C. A.; Brown, K. L.

Technical Memorandum, Campden Food Preservation Research Association No. 250, 33pp. (1980) [8 ref. En]

Various studies investigating the microbiology of aseptic packaging of various foods are described, i.e. studies of heat resistance of bacterial spores in reconstituted food particles (preparation of reconstituted food particles, calculation of treatment times, recovery of survivors), studies on the resistance of bacterial spores to superheated steam, detn. of the heat destruction parameters of *Bacillus stearothermophilus* at high temp., effect of heating rate on activation of *B. stearothermophilus* spores, production and heat resistance of spore crops of *Clostridium sporogenes* PA3679. Experimental details, and relevant results are discussed in each section, as related to numerous tables and graphs which are included. LH

15

Effects of ultra-high temperature processing on size and appearance of casein micelles in bovine milk.

Freeman, N. W.; Mangino, M. E.

Journal of Dairy Science 64 (9) 1772-1780 (1981) [14 ref. En] [Dep. of Food Sci. & Nutr., Ohio State Univ., 2121 Fyffe Road, Columbia, Ohio 43210, USA]

Effects of UHT treatment by falling-film-steam-infusion on the size and appearance of casein micelles in bovine milk were examined by electron microscopy. Preheating and homogenization at 65.6 or 82.2°C for approx. 150 s did not alter mean micelle size compared with raw milk, although it resulted in a narrower size distribution and increased tendril formation. Samples of UHT milk treated for 3.4 s exhibited larger mean micelle diam. and greater tendril formation than those treated for 1.5 or 9.0 s. Increased numbers of small diffuse particles were present in samples treated for 9.0 s. Samples preheated at 82.2°C and treated at > 121.1°C showed increasing micelle diam. with increasing temp. with the exception of those heated at 146.1°C. Initial heat-induced micellar growth was followed by micellar disintegration or disaggregation. Studies on samples stored for 3 months at room temp. revealed no general trends. However, the pattern of micellar growth followed by development of a large number of small diffuse particles was discerned. AS

16

[Enzymic proteolysis in UHT milk products. II. Relationship between heating intensity, inactivation of native milk proteinase and keeping quality.]

Driessen, F. M.

Zuivelzicht 73 (33/34) 688-689 (1981) [4 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Experiments showed that storage life of UHT milk was affected more by variations in holding time (0, 4, 8 or 16 s at 140°C) than by variations in heating temp. (134-146°C, with a constant holding time of 4.8 s). The heating temp. had little effect on the residual activity of native milk proteinase but did influence the development of bitter flavour, which occurred within

6 wk after direct UHT treatment at 137°C but not until 12 wk after treatment at 143°C. Increase in holding time markedly slowed down proteolysis at 20°C (as measured by starch gel electrophoresis) but also resulted in cooked flavour. After heating for 16 s at 140°C organoleptic characteristics remained satisfactory during storage for 12 wk at 20°C, even though milk proteinase was not completely inactivated. With a holding time of 4.8 s proteolysis was much more rapid after direct UHT treatment (Alfa-Laval VTIS system) than after indirect treatment (Stork Steridial system), but with longer holding times this difference was not so pronounced. It is concluded that dairies producing UHT milk must choose between (i) milk with a limited storage life, e.g. 6 wk, but good flavour and (ii) milk with a long storage life, e.g. 3 months, but cooked flavour. ADL

17

Statistically reproducible evaluation of size of casein micelles in raw and processed milks.

Mangino, M. E.; Freeman, N. W.

Journal of Dairy Science 64 (10) 2025-2030 (1981) [21 ref. En] [Ohio Agric. Res. & Development Cent., Ohio State Univ., 2121 Fyffe Road, Columbus, Ohio 43210, USA]

The method developed for rapid examination of casein micelles in raw skim milk, UHT milk and rennet-treated milk consists of fixing the sample as a 5% solution in 1% glutaraldehyde buffered at pH 6.7 with 2,4,6-trimethylpyridine. 1 drop of fixed sample was applied to a clean slide and air dried. The slide was dipped in 0.6% Parlodion/amyl acetate solution and air dried. The film was floated onto water, allowed to settle onto Cu grids, which were viewed on an RCA EMU-3H Transmission Electron Microscope without shadowing. Mean casein micelle diam. in 3 samples of skim milk varied from 64.4 to 67.0 nm. Size distributions were slightly non-normal, but further tests indicated that a sample size of 250 micelles was large enough to treat the data as though they were normal. The method can be applied to processed milks as well as raw milk. MEG

18

Shelf-life of aseptically bottled orange juice.

Mannheim, C. H.; Havkin, M.

Journal of Food Processing and Preservation 5 (1) 1-6 (1981) [5 ref. En] [Dep. of Food Eng. & Biotech., Technion - Israel Inst. of Tech., Haifa, Israel]

The storage stability of aseptically bottled orange juice stored at 4°, 15°, and 25°C was compared to that of hot filled juice. Criteria for stability evaluation were ascorbic acid retention, browning as measured by optical density, tristimulus colour reflectance and organoleptic evaluation. It was found that the governing factor establishing shelf-life was storage temp. rather than method of filling. Quality parameters for the juices stored at 4° and 15°C were similar for both methods of filling. No difference was found in sensory evaluations between aseptically filled juices and hot-filled juices stored at the same temp. after 60 days storage. Immediately after filling the aseptically filled juice was judged slightly better, but this difference disappeared

rapidly during storage even at 4°C. In all cases juices stored at the lower storage temp. were judged better than those stored at the higher temp. regardless of filling method. AS

19

Food process.

Unilever Ltd.

British Patent 1 592 148 (1981) [En]

Method of aseptically packaging bakery products is described. Products are baked in a package of flexible impervious foil providing an aseptic barrier and having a vent. After cooling, the vent is sealed and the sealed package is heated to pasteurize the product. AS

20

New way with milk.

Anon.

Food Technology in New Zealand 16 (1) 25-27, 29, 31 (1981) [En]

The UHT processing plant of the Ambury Milk Co. at Takanini, New Zealand is described. The installation is a pilot plant of the New Zealand Dairy Board, and the first of its kind in the country. It has a capacity of 2000-4000 l/h, and employs direct heating with live steam, and the milk is packaged on AB 3 Tetrabrik aseptic packaging machines. JRR

21

[Psychrotrophic bacteria in milk.]

Whang, D. W.; Cho, J.

Korean Journal of Veterinary Public Health 5 (1) 11-14 (1981) [18 ref. Ko, en] [Maeil Dairy Ind. Co. Ltd., Seoul, S. Korea]

Mean counts of psychrotrophic bacteria in raw milk were: 10×10^5 /ml in summer (June-Aug.), 8×10^5 /ml in autumn (Sept.-Nov.), 2.5×10^5 /ml in winter (Dec.-Feb.) and 4×10^5 /ml in spring (March-May). No psychrotrophs were detected in UHT treated milk (135°C for 2 s). Analysis of 72 samples of commercial pasteurized milk showed that 36% contained 0-1 psychrotrophs/ml, 28% contained 2-10/ml, 31% contained 11-500/ml, 3% contained 500-1000/ml and 3% contained > 1000/ml. High counts were mainly associated with sweetened pasteurized milk. [From En summ.] MEG

22

Heat resistant bacterial lipases and ultra-high temperature sterilization of dairy products.

Adams, D. M.; Brawley, T. G.

Journal of Dairy Science 64 (10) 1951-1957 (1981) [15 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Properties of a heat-resistant lipase produced by *Pseudomonas* sp. MC50 (a psychrotroph isolated from raw milk) were studied. The lipase was resistant to heating in milk at 100-150°C and would be expected to survive UHT treatment at 121-149°C for 0.5-8 s. Optimum temp. and pH for lipase MC50 activity in butter oil emulsion were 40°C and 8.5, resp.; max. lipase activity was obtained with 5% butter oil emulsions. 5 samples of whole milk and 4 of 10% half-and-half

were UHT sterilized at 137.8°C for 20.7 s, at 143.3°C for 7 s or at 148.9°C for 3.4 s, packaged aseptically and stored at room temp. or 40°C for up to 36 wk. All samples contained lipase activity that survived UHT treatment. Mean activity at 40°C was $1.9 \times$ greater than at room temp. (25°C). These results indicate that heat-resistant bacterial lipases may cause rancidity in UHT milk products during storage. MEG

23

The influence of UHT heating and sterilization on lysine in milk.

Horak, F. P.; Kessler, H. G.

Milchwissenschaft 36 (9) 543-547 (1981) [15 ref. En, de] [Inst. for Dairy Sci. & Food Eng., Tech. Univ. Munich, Weihenstephan, Freising, Federal Republic of Germany]

Whole milk was heated at 130-160°C for 50 s to 150 min and lysine losses were determined by the Udy dye-binding method [see FSTA (1971) 3 7A300] as well as the DNP method. The 2 methods compared relatively well up to a lysine loss of about 50%. Evaluation of results by a graphical method [Näser (1971), *Physikalische Chemie*, VEB-Verlag, Leipzig] showed that loss of lysine in whole milk can be described by a 2nd order reaction; in the Arrhenius equation, the activation energy had a value of 108 kJ/mol and log velocity constant was 10.2. Using these constants, lysine losses could be calculated as a function of time and temp. Good agreement was obtained between measured and calculated values of lysine losses, especially in the range 10-60%. The equations were valid in the ranges 4-160°C and 2 s to 6 months. Lysine losses were calculated to be 0.1-1% in UHT milk and 3-10% in sterilized milk. DMK

24

[Evaluation of thermal efficiency of UHT installations. III. F values of UHT installations.]

Bewertung der thermischen Wirksamkeit von UHT-Anlagen. III. Berechnung von Sterilisationswerten (Fortsetzung).
Reuter, H.

Deutsche Molkerei-Zeitung 101 (48) 1793-1798 (1980) [22 ref. De] [Inst. für Verfahrenstechnik der Bundesanstalt für Milchwirtschaft Kiel, Federal Republic of Germany]

Temp.-time curves are plotted and F_m , F_c , F_d and S_H values tabulated for 3 direct and 7 indirect UHT installations tested in the Federal Republic of Germany. These values, which are discussed in detail, characterize the killing of microorganisms and spores (F_m), enzyme inactivation (F_c), chemical degradation reactions (F_d) and chemical combination reactions (S_H) during the UHT process. The S_H value can be used to characterize the formation of 5-(hydroxymethyl)-2-furaldehyde (HMF) as a byproduct of the Maillard reaction. Changes in F_m and F_c values with changes in holding temp. and vol. flow are plotted for 1 of the direct and 2 of the indirect UHT installations. [See FSTA (1981) 13 7P1163 & 7P1164 for parts I & II.] ADL

25

Rheological behavior of ultra-high temperature steam injected dairy products on aging.

Swartzel, K. R.; Hamann, D. D.; Hansen, A. P.

Journal of Food Process Engineering 3 (4) 143-159 (1980) [29 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Milk (0.5, 3.25, and 10.5% fat) was processed in a UHT steam injection system. Process time-temp. relationships included 138°, 143° and 149°C for 20.3 s; 143° and 149°C for 6.9 s; and 149°C for 3.4 s. Product from each run was stored at 4°, 24°, and 40°C. Using commercial viscometer assemblies the flow behaviour constants of the power-law equation were determined for each treatment through 60 wk storage. Regression analysis of the calculated power law constants resulted in a graphical summary of the history of flow properties for each treatment. Age-thickening (gelation) was associated with process residence time, storage temp. storage time, and fat level. Process temp. was not a significant factor. The shorter the residence time the faster gelation occurred. The earlier a sample gelled the faster its rate of gelation. For a given residence time, gelation developed first in samples of low % fat and progressed through higher fat contents. A gelation prediction nomograph based on fat level, residence time, and storage time is presented for a 24°C storage temp. AS

26

Rheological modeling of UHT milk gels using a cone and plate creep-relaxation test.

Swartzel, K. R.; Hamann, D. D.; Hansen, A. P.

Journal of Food Process Engineering 3 (3) 161-174 (1980) [15 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Gelation of UHT steam injected dairy products was investigated by determining rheological model constants. Fat % of the products were 0.5, 3.25 and 10.5. Each product was processed at 143°C for 6.9 s and stored at 24°C. At 4-wk intervals, from 55 to 85 wk storage, cone and plate creep-relaxation data was collected. 3 element rheological models were developed for each test date. Empirical relationships were derived relating the elastic and viscous constants to storage time for each fat content. The strongest parameter for all samples was the series elastic constant. The viscous constant was next with the Kelvin elastic constant being much weaker. All constants for all samples increased over storage time as gelling progressed (apparent viscosity increased). The lower the % fat the sooner gelling started and the faster the rate. Gelation of UHT milk depended heavily on % fat. AS

27

Developments in heat treatment plant.

Cattell, G. S.

Journal of the Society of Dairy Technology 34 (4) 165-169 (1981) [En] [Process Marketing Dep., APV Int. Ltd., PO Box No. 4, Crawley, W. Sussex, UK]

Developments in the pasteurization process aimed at achieving > 90% regeneration are dealt with briefly. The concept of UHT processing, and developments in both indirect and direct systems, are discussed in detail, and the economic and process parameters of the various machine types are compared. CDP

28

[Heat treatment process, particularly for UHT treatment, and heat exchanger for carrying out the process.] Verfahren zur Wärmebehandlung, insbesondere Ultraschallheizung, sowie Wärmeaustauscher zur Durchführung des Verfahrens. Finnah, J.

German Federal Republic Patent Application 3 010 013 (1981) [De]

In the UHT processing of milk and milk products, fruit juices etc. the product passes through indirect counterflow heat exchangers provided with a preheating zone, a high temp. zone and a cooling zone. The heat carrier used in the first and final zones is the same and consists of water. The heat carrier used in the high temp. zone is hot water or steam which, after it has passed through the high temp. zone, is fed into the liquid, comprising the circulating heat carrier in a closed loop employed in the first and final zones. Uniformity of heating and a saving in energy result from the use of this method. W&Co

29

Storage stability of orange juice concentrates packaged aseptically.

Kanner, J.; Fishbein, J.; Shalom, P.; Harel, S.; Ben-Gera, I.

Journal of Food Science 47 (2) 429-431, 436 (1982) [En] [Dep. of Food Tech., Agric. Res. Org., Volcani Cent., Bet-Dagan, 20-520, Israel]

Orange juice concentrates were packaged aseptically by a "Dole" aseptic canning machine using 6 oz metal cans. The final juice products (11°, 34°, 44°, 58° Brix) were stored between -18° and 36°C and tested periodically for nonenzymic browning, ascorbic acid destruction, furfural and sensory changes. Nonenzymic browning, the main deterioration phenomena in these products, was satisfactorily retarded at ≤12°C. Ascorbic acid destruction rate constant was dependent on temp. between 5° and 25°C, and was affected by degree of juice concn. Furfural accumulation in juice was higher than that in 58° Brix concentrate. Orange juice concentrate of 58° Brix did not show flavour changes after storage at 5° or 12°C for 17 or 10 months, resp., when evaluated after reconstitution to 11° Brix. IFT

30

U.H.T. and aseptic packaging.

Bradshaw, J. H.

Cultured Dairy Products Journal 7 (1) 13-16 (1982) [En] [Palm Dairies Ltd., Calgary, Alberta, Canada]

This account of general aspects of UHT processing includes experience obtained with UHT products at the author's dairy plant. The public acceptance of UHT chocolate milk is said to be very good, with very high sales of 250-ml packs in the rural school system, supermarkets, small retail outlets and restaurants. A trend towards UHT chocolate milk consumption by young people is attributed to the enhancement of the chocolate flavour by the UHT processing, compared with pasteurization. FL

31

[Effect of holding time characteristics of UHT installations on the F value.] Einfluss des Verweilzeitverhaltens von UHT-Anlagen auf den F-Wert.

Kiesner, C.; Reuter, H.

Milchwissenschaft 36 (6) 353-355 (1981) [8 ref. De, en] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

This is a mathematical interpretation based on the statements of R. N. Batenson [FSTA (1972) 4 6E254] and O. Levenspiel [*Chemical Reaction Engineering* Ed. 2 (1972)] of the relationship between real F value derived from holding time distributions in various UHT units and the F value of the average holding time in UHT installations. SKK

32

Apparent viscosity of milk and cultured yoghurt thermally treated by UHT and vat systems.

Labropoulos, A. E.; Lopez, A.; Palmer, J. K.

Journal of Food Protection 44 (11) 874-876 (1981) [12 ref. En] [Dep. of Food Sci. & Tech., Virginia Polytech. Inst., Blacksburg, Virginia 24061, USA]

Samples of raw milk were homogenized and heat-treated either in a continuous, indirect UHT system at 149°C for 2.2 or 3.3 s, or in a vat system at 63° or 82°C for 30 min. Samples were then cooled to 42°C, inoculated with 3% starter, incubated at 42°C for 4-5 h and then stored at 4°C for 12-48 h before viscosity measurements were made. UHT milk was more viscous than milks heated at 63° or 82°C (apparent viscosities 2.3-2.7 vs. 1.9-2.0 cP). All yoghurts exhibited thixotropic behaviour. The apparent viscosity of yoghurt prepared from UHT milk was 0.8 cP after 14 min shearing, whereas that of yoghurt prepared from milk heated at 63° and 82°C was 1.8 and 3.9 cP resp. Results suggest that yoghurt prepared from UHT milk could be of more value as a drinkable rather than as a spoonable product. MEG

33

Aseptic packaging promises new role for pasteurized liquid eggs.

Jacobs, L. C.

Food Product Development 15 (4) 38-40, 64 (1981) [En]

A 2-step technique whereby liquid eggs are pasteurized then aseptically packaged without changing the functionality of the eggs is being investigated. When perfected this would offer a less expensive, more convenient alternative to conventionally frozen eggs used by many food processors and manufacturers. The method involves breaking whole eggs and pasteurizing them, either whole or separated into white and yolks, at temp. of 146-148°F for 30-90 s. The intention is to destroy the bacteria without destroying the eggs' functional properties. The idea is to put the processed eggs into cans, but not to freeze them, just hold them under refrigeration. VJG

34

Effect of process and temperature during storage on ultra-high temperature steam injected milk.

Earley, R. R.; Hansen, A. P.

Journal of Dairy Science 65 (1) 11-16 (1982) [22 ref. En] [Dep. of Food Sci., North Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Milk (3.25% fat) was processed by UHT steam injection at 138°C for 20.4 s or 149°C for 3.4 s, and was packaged aseptically. The UHT milk was stored at 24° and 40°C. Fat-soluble alkanals were analysed at 0, 8 and 24 wk. Dissolved oxygen content and acid degree values (ADV) were measured at 4-wk intervals for 24 wk. Methanal, propanal, butanal, and nonanal were identified in the 2 UHT samples at 0 wk (0.6-30.05 µmol/kg fat). These compounds decreased during storage at both 24° and 40°C. Dissolved oxygen content increased linearly in samples stored at 24°C but decreased and remained at a min. (0.6-0.7 p.p.m.) in samples stored at 40°C. The ADV increased in all samples. AS

35

[Is aseptic packaging applicable to solids?]

Alle, C.

Alimentation No. 72, 53-57 (1979) [Fr]

After a survey of aseptic packaging techniques used for liquids and consideration of the thermal behaviour of solids, it is concluded that solid particles of diam. <3 cm can be aseptically packaged and retain desirable organoleptic quality. DIH

36

[Installations for aseptic filling of cartonboard packages.] Anlagen zur aseptischen Abfüllung in Kartonverpackungen.

Schulte, D.

Molkerei-Zeitung Welt der Milch 35 (26) 837-841 (1981) [De] [Tetra Pak, Hochheim, Federal Republic of Germany]

This paper contains a very detailed description (illustrated by diagrams) of the sterilization procedures for packaging material and machinery of the Tetra Brik Aseptic AB3 and AB8 filling machines and their operation, and of the packaging material used in these machines. SKK

37

The best little tomato paste plant in Italy.

LeMaire, W. H.

Food Engineering International 6 (12) 28-30, 32-33 (1981) [En, de, fr, es]

An aseptic bulk packaging technique now used by Desco SpA of Italy is described: the firm produces tomato paste in bulk. The paste is aseptically filled in 'Steril Food' drums that are tinned and have an inner coating of a special food-grade lacquer. Production flow from delivery of tomatoes to packaging is described, and the advantages of the new packing method are briefly considered. RAW

38

[Efficacy of aseptic packaging of semi-manufactured fruit juices.]

Grushevoi, S. B.; Osipov, P. V.

Pishchevaya Promyshlennost', Respublikanskii Mezhvedomstvennyi Nauchno-tekhnicheskii Sbornik No. 24, 55-57 (1978) [2 ref. Ru]

Aseptic packaging of fruit juices offers a 45-50% reduction in storage space for the finished product, and a 50-52% reduction in the storage space for the glass containers. This can save capital expenditure (in new plant) or output can be increased owing to reduced costs for storage (in existing plant). This potential can be expressed quantitatively from the ratio between the storage space released and the specific capital expenditures/unit packaged product. STI

39

[UHT installations for highly viscous products.] UHT-Anlagen für hochviskose Produkte.

Malitz, -.

Molkerei-Zeitung Welt der Milch 35 (33) 1048-1050 (1981) [De] [Ahrens & Bode, Schöningen, Federal Republic of Germany]

The 'Abotherm' UHT installations with indirect heating (manufactured by Ahrens & Bode) are intended for highly viscous products (up to 1200 cP at 15°C) and with shearing flow rate of 39.4 l/s. and are particularly designed for treatment of fruit juices, fruit juice concentrates and fruit preparations used in the manufacture of fruit yoghurt, ice cream and desserts. The product flows in single stream, passing through vacuum degassing equipment before entering the heat exchangers, which consist of double or treble coiled pipes heated by saturated steam. The sterilized product is aseptically packaged in cartons. Installations for UHT treatment of fruit juices are of 11 000 l/h max. capacity, and are adaptable by slight modification for UHT treatment of fruit juice concentrates and preparations at up to 7000 l/h. Programmed control is provided for all cleaning, sterilization and production operations. SKK

40

[Changes in the nutritive value of UHT sterilized milk during storage.]

Vujicic, I.; Hasan, A.; Tanasin, L.

Hrana i Ishrana 22 (7/10) 259-261 (1981) [6 ref. Sh. en] [Odeljenje za mickarsivo Poljoprivrednog Fak., Novi Sad, Yugoslavia]

Milk was UHT-treated indirectly and packaged in 0.5 l Tetra Pak or in 1 l Tetra Brik containers, or directly heated and packaged in 0.5 l Tetra Pak containers. All packages were stored without disturbance at 5, 20, 37 or 55°C for 180 days. Losses in nutritive value (due to fat, lactose and protein adhering to the wall of the containers) were considerably reduced during storage at lower temp. In packages turned once weekly during storage for 20 days, cream deposit was reduced by half; after storage for 60 days it was reduced 20-fold. Rotation of the packages resulted in a 3- to 5-fold reduction in sediment formation. ASu

41

[Testing and appraisal of the UHT installation type 6500.]

Kessler, H. G.; Horak, F. P.

Molkerei-Zeitung Welt der Milch 35 (39) 1233-1234, 1236-1238 (1981) [4 ref. De] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

The indirect-treatment UHT installation type 6500 manufactured by MVA Maschinen-Vertriebs-GmbH, D-4422 Ahaus, Federal Republic of Germany installed in the Milchwerken Naarmann, Neuenkirchen, dairy factory and coupled with a Tetra Pak aseptic packaging machine of 4000 l/h capacity was tested. The flow-sheet of the installation is presented and the milk treatment process during testing is described. The tests concerned milk flow, time/temp. relationships, variation of holding time, cleaning interval, construction, assembly, materials, finish, control and safety equipment, cleaning, and sterilization. Nutritive value and bacteriological quality of milk were assessed [see FSTA (1981) 13 8P1448 for book giving methods used]. The installation tested was fully satisfactory on all scores. SKK.

42

[Cleaning and chemical sterilization as sanitation for aseptic food packaging.] [Review]

Ueda, O.

Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 28 (6) 338-346 (1981) [86 ref. Ja] [Tanabe Seiyaku Co. Ltd., Special Products Marketing Div., Tech. Dep., 21 Doshomachi 3-chome, Higashi-ku, Osaka, 541 Japan]

This review considers cleaning systems and the use of detergents and other cleaning agents, and the use of chemical sterilizing agents. The application of cleaning and chemical sterilization to aseptic and semi-aseptic packaging is outlined and the pros and cons of the two methods are discussed. Most of the references are to works in Japanese. CIH

43

[Principles of aseptic packaging.] Grundlagen des aseptischen Verpackens.

Wartenberg, E. W.

Molkerei-Zeitung Welt der Milch 35 (25) 797-801, 816 (1981) [De]

This paper discusses the fundamentals of development of microorganisms in food; outlines the procedures of the classic sterile packaging, and of aseptic packaging as exemplified by UHT milk; and considers composition and production of packaging materials, their sterilization, sterility requirements, 'commercial sterility', and guaranteed shelf life of UHT milk in different countries. SKK

44

Aseptic packaging of milk and milk products.

[Review]

Mann, E. J.

Dairy Industries International 47 (5) 29, 31 (1982) [25 ref. En] [Commonwealth Bureau of Dairy Sci. & Tech., Shinfield, Reading, RG2 9BB, UK]

Recent developments in aseptic packaging of milk products, particularly liquid UHT milk, and packaging machines of several manufacturers using cartons or cups, in operation in various countries are reviewed. FL

45

[Storage of UHT milk: the different storage systems.] Anon.

Technique Laitiere No. 962, 9-10 (1982) [Fr]

Various systems for handling UHT milk in distribution stores are described, with photographs and diagrams. [See following 2 abstr.] ADL

46

[Storage of UHT milk: the Quatre Cantons & Cambresis cooperative has chosen an accumulation system.]

Anon.

Technique Laitiere No. 962, 17-20 (1982) [Fr]

A detailed description is given of the system used for handling UHT milk (40 million l/yr) in a dairy at Le Quesnoy, France [see FSTA (1981) 13 7P1266]. The 1-l brick-type cartons, grouped in packs of 6, are put on pallets holding 750 l. Each pallet is overwrapped in shrink-film and conveyed to the distribution store, where it is put on a roller frame and marked with the product code, batch number (generally corresponding to 1 day's output) and expiry date. The store, 1500 m² in area and 12 m high, holds 4150 pallets in 2 blocks of shelves, separated by a central gangway. There are 33 columns of shelves, with 8 levels. A dynamic accumulation system is used, with a "transstocker", which is further described. [See preceding abstr.] ADL

47

[Storage of UHT milk: Elnor has chosen a system based on 3-way trucks for its Ressons factory.] Anon.

Technique Laitiere No. 962, 13-16 (1982) [Fr]

The truck used to distribute pallets of cartons containing various milks in the storage warehouse is described and its advantages discussed. [See preceding 2 abstr.] LH

48

[Alfa-Laval Steritherm: a new generation of UHT plants.] Alfa-Laval Steritherm. Eine neue Generation von UHT-Anlagen.

Bake, K.

Molkereitechnik 43, 26-38 (1979) [De]

A detailed description is given of the new Alfa-Laval Steritherm UHT plants [see FSTA (1979) 11 2E55 & (1978) 10 12E347] and the VTIS range, employing direct steam injection, and first introduced 15 yr ago. The modified VTIS-C installations have capacities of 4000, 8000 and 12 000 l/h, have automatic ALFIC controls, continuous runs of > 12 h and may be cleaned during the run (intermediate cleaning) under aseptic conditions. The milk sterilization temp. is 140°C and holding time 3-4 s; evaporative cooling is to 76°C, followed by water cooling, and aseptic homogenization. If milk sterilization temp. is not attained, the flow diversion valve stops the milk supply and activates hot water circulation (finally at 140°C for 2-3 min) and normal operation may then be resumed. FL

49

[Effect of UHT treatment and storage of milk on its content of volatile acids.]

Tylkin, V. B.; Tsaberyabaya, N. I.

Tovarovedenie 14, 35-37 (1981) [4 ref. Ru]

Contents of volatile acids determined by GLC in raw milk and in milk after UHT treatment were resp. (mg/100 g): formic 0.24 and 0.94, acetic 0.32 and 2.68, butyric 0 and 0.20, propionic 0 and 0.18, and pyruvic 0 and 0.35. Tabulated data on contents of these acids in UHT milk stored for up to 6 months showed progressive increase in all; values for the 5 acids at 3 months were resp. 2.85, 5.12, 2.25, 1.24 and 1.20 mg/100 g; at 6 months, they were 6.20, 8.62, 6.98, 2.19 and 2.54. It is considered that at total contents of > 12-15 mg/100 g, volatile acids would impair the quality of stored UHT milk. SKK

50

[Saprophytic bacterial metabolites in UHT milk for bacteriological quality assessment of the raw milk used.] Saprophytär-bakterielle Stoffwechselprodukte in der UHT-Milch zur Beurteilung der bakteriologischen Wertigkeit des verwendeten Ausgangssubstrates.

[Thesis]

Muschik, P.

(1979) [De] Federal Republic of Germany; Universität Kiel

Equations were derived for estimating the pyruvate content of raw milk from the pyruvate content of UHT milk prepared from it. Lactate and free fatty acid contents of milk were not affected by UHT treatment or by H₂O₂ concn.; the NH₃ concn. was affected both by heating and storage. Tyrosine value, amino-N and residual-N were only slightly affected by the heat treatment, but were useful in indicating proteolytic changes when bacterial counts exceeded 10⁶/ml. BWH

51

[Liquid milk and preserved milks in the jubilee year.] Oterholm, B.

Nordisk Mejeriindustri 8 (5) 283-286 (1981) [No]

Details are given of the current range, output, total sales, per capita consumption, packaging, bacteriological quality and organoleptic quality of liquid milk products (market milk, cultured milks, cream, dairy desserts etc.) in Norway, together with brief information on output and sales of preserved (dried and UHT) milk products. [See also *Meieriposten* (1981) 70 (10) 338-343, 345, 347.] ADL

52

[Testing and technical appraisal of the GEA Ahlborn UHT installation type IHS.] Prüfung und technische Begutachtung der GEA Ahlborn-UHT-Anlage Type IHS.

Kessler, H. G.; Horak, F. P.

Deutsche Milchwirtschaft 32 (37) 1378-1383 (1981) [4 ref. De] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

The UHT installation type IHS manufactured by GEA Ahlborn GmbH & Co. KG (Federal Republic of Germany) was tested in operation in the Milchzentrale Mannheim-Heidelberg AG (Federal Republic of Germany) during 3 days of Sept. 1979. The whole installation consisted of the indirect heating IHS unit of 11 000 l/h nominal capacity, a GEA Ahlborn sterile tank, and a PKL packaging machine of 10 000 l/h nominal capacity. A flow sheet of the assembly is presented and operation of the installation is described in detail. Test results are given on checks of milk flow, time/temp. relationships, duration of continuous runs, as well as data on evaluation of construction, assembly, materials, finish, control and safety equipment, reliability, recording equipment, cleaning and sterilization. Nutritional value and bacteriological condition of the UHT milk were examined. As a result of all tests, no objections are raised to acceptance of the installation for production of UHT milk. SKK

53

Aseptic processing. A study to establish the capabilities and limitations of available machinery for aseptic processing and packaging of foodstuffs. Atherton, D.

Technical Memorandum, Campden Food Preservation Research Association No. 270, 35pp. (1981) [31 ref. En] [Campden Food Preservation Res. Ass., Chipping Campden, Glos., GL55 6LD, UK]

This project was done to determine whether UK resources ought to be devoted to the development of machinery for aseptic processing and packaging of foodstuffs. The introduction deals with the following sections: improvements in product quality, other claimed advantages for aseptic processing, improved nutrient retention, container size, container type, cost savings, product range. Product sterilization and cooling section discusses: plate heat exchangers, tubular

heat exchangers, scraped surface heat exchangers, other indirect systems, steam injectors, steam heaters, APV Jupiter system, Steriglen system, electrical heating methods, cooling. Container sterilization and aseptic filling and sealing section discusses the following systems: dole, bulk containers, Sholle, Tetra Pak, Ex-Cell-O, Bertopack, Thimonnier, Hassia, Asepak, Robert Bosch, FMC, Metal Box, Gasti, Erca, Rommelag. A conclusion, 3-pp. bibliography and an appendix of manufacturers of aseptic processing equipment are included. LH

54

[New generation of packaging machines.]

Anon.

Latte 5 (9) 596-597 (1980) [It]

An account is given of 2 machines that fill and aseptically seal cartons of coffee cream and other products (Robert Bosch Co., Hoefliger + Karg division).

The smaller of the 2 models, TFA 240 AS, can produce 375 single-portion cream cartons (7-15 g each)/min. The larger SERVAC 78 AS machine produces 1500 cream cartons/min; it can also fill 100-g cartons with yoghurt or other dessert products at a slower rate. MC

55

Milk fat globule membrane proteins in aseptically packed ultra-heat-treated milk: changes during storage.

Yamauchi, K.; Shimizu, M.; Ando, T.

Agricultural and Biological Chemistry 46 (3) 823-825 (1982) [12 ref. En] [Dep. of Agric. Chem., Univ. of Tokyo, Bunkyo-ku, Tokyo 113, Japan]

Samples of UHT milk (indirectly heated at 140°C for 2 s and aseptically packed in 1-l Tetra Bricks; 3.4% fat) were examined after storage for 1, 3, 5 and 12 months at 30°C in the dark. No gelation was observed after storage for up to 1 yr, but the formation of a cream plug on the milk surface was observed after 1 month.

Creaming stability gradually decreased with storage. 3 milk fat globule membrane (MFGM) protein fractions were prepared from cream washed with 0.1M EDTA by extraction with 0.1M NaCl (MFGM-A) followed by 5M urea (MFGM-B) and then delipidating residual cream with methanol-chloroform (1:2, v/v) (MFGM-C). During storage, MFGM-A content decreased and MFGM-C increased up to 3 months. Polyacrylamide gel electrophoresis revealed that MFGM-A and -B were caseins while -C consisted of caseins and whey proteins. Electrophoretic bands for MFGM-A and -B became faint and blurred after storage of milk for 1 month or longer, probably due to compositional changes in caseins. In MFGM-C, the relative abundance of the γ_{S2} -casein band increased from 2.8 to 11.6% during storage for 5 months, but that for major caseins decreased from 29.8 to 22.4%. It is suggested that these changes in MFGM may affect the interactive properties of fat globules, altering the stability of the milk fat emulsion. LMM

56

Non-destructive inspection of aseptic packaging.

Andres, C.

Food Processing 43 (1) 166-167 (1982) [En]

Aseptically packaged foods can be recontaminated if a defect exists in the package material or the heat seal. A non-destructive monitoring system is described which assesses seal/package integrity without touching the package, and operates automatically at line speeds. The equipment operates on the principle that in a properly sealed package the internal partial vacuum produces a specific package sidewall shape, i.e. slightly concave, whereas if a leak is present, the wall will bulge outwards. By sensing the Al foil layer of the package electronically, the shape and hence the package integrity is monitored. The unit can be used on all containers having an Al layer as part of the laminations. JRR

57

Aseptically packed juice and milk taking hold on U.S. market.

Ellis, R. F.

Food Processing 43 (1) 96-100 (1982) [En]

The increase in aseptic packaging of foods in the USA since FDA approval of the technique is surveyed, and 4 equipment systems currently available for aseptic packaging are described. JRR

58

Aseptic system fills pre-formed cups with liquid or non-liquid products.

Anon.

Food Engineering 53 (8) 187 (1981) [En]

A new aseptic filler for a wide range of cup sizes, styles and materials was recently introduced by Aseptic Technology Engineering Co. (ASTEC). The new system, named ASTEC 2000, differs from existing aseptic packaging systems in its utilization of pre-sterilized, pre-cut containers and lids. The ASTEC 2000 handles container size 1-6 in, vol. up to 68 oz, and may operate at 12-45 containers/min, depending on product type and container size. The system can handle a particle size of up to 30 mm, and may be used to package liquids, e.g.

fortified milk, juices and fruit drinks, and non-liquids, e.g. pastes, slurries, fruit cocktail, puddings and spaghetti. The major market is expected to be single-service packagings, e.g. as used in airlines. RAW

59

Ocean Spray pioneers in aseptic packing of juices.

Ellis, R. F.

Food Processing 43 (1) 104-105 (1982) [En]

Ocean Spray Cranberries Inc. is one of the first processors in the USA to market aseptically packed fruit juices in individual-size cartons. Cranberry/apple, grapefruit and cranberry juice cocktail products are now packed aseptically after HTST heating to achieve commercial sterility. JRR

✓ **Aseptically packaged papaya and guava puree: changes in chemical and sensory quality during processing and storage.**

Chan, H. T., Jr.; Cavaletto, C. G.

Journal of Food Science 47 (4) 1164-1169, 1174 (1982)

[En][USDA-SEA-AR, Tropical Fruit & Vegetable Res. Lab., PO Box 917, Hilo, Hawaii 96720, USA]

Effects of storage temp. and time on the quality of aseptically processed, "bag-in-box" packaged guava and papaya puree were investigated. During aseptic processing of guava puree there was virtually no loss of ascorbic acid (AA) and flavour but significant losses in colour. After 6 months ambient storage the AA loss was about 30% and further colour changes and flavour losses occurred. Samples stored at 38°C for 3 months showed an AA loss of about 47% and losses in colour and flavour. For papaya puree AA losses of about 6% and 56% occurred during aseptic processing and after 6 months ambient storage, resp. Colour changes during aseptic processing and the first month of storage was characterized by a hypsochromic shift of the carotenoids' absorption spectra. After the first month of storage further colour changes were attributed to the products of nonenzymic browning. Papaya flavour was stable during both aseptic processing and 6 months ambient storage. Flavour of papaya puree stored at 38°C for 3 months changed significantly and AA retention was 39%. IFT

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